

ENERGY CONSERVATION IN MESSHALLS



U.S. MARINE CORPS



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FORWARD

This publication, NAVMC 2733, ENERGY CONSERVATION IN MESSHALLS, provides guidance and information on the application and use of food service energy conservation procedures and emphasizes energy conservation through proper operation and maintenance of food service equipment. It also contains principles of energy management.

Over the last several years, there has been a continued increase in the use of energy consuming equipment within the food service industry of our country. This is especially true in new and modernized Marine Corps messhalls. Because of the national energy situation, and the tremendous amount of energy consumed by messhalls, commanders and food service personnel must become more aware of energy conservation procedures.

Significant reductions through conservation measures can be made without affecting the nutrition, health, and welfare of our Marines. In the case of cooking equipment, this can be accomplished by monitoring the types of utensils used and the ways they are to be used. It also requires setting controls to the correct temperatures for each operation and reducing the temperature for idle or slack periods of time. The condition and the manner in which equipment is used also have an impact on the amount of energy consumed. To save energy we may be required to change the work schedules, food preparation methods, and retraining of food service personnel.

Marine Corps installations and operating forces (divisions, wings, force service support groups, etc.) should establish an energy conservation program within each command operating a messhall.

Commanders with operational control of messhalls, to include clubs and exchange restaurants, are to use the information contained herein to achieve and maintain energy conservation goals.

For requisitioning instructions, see the current edition of MCO P5600.31, Marine Corps Publications and Printing Regulations.

Reviewed and approved this date.

A handwritten signature in black ink, reading "W. G. Carson Jr." with a stylized flourish at the end.

W. G. CARSON, JR.
Deputy Chief of Staff
for Installations and Logistics

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ENERGY CONSERVATION IN MESSHALLS

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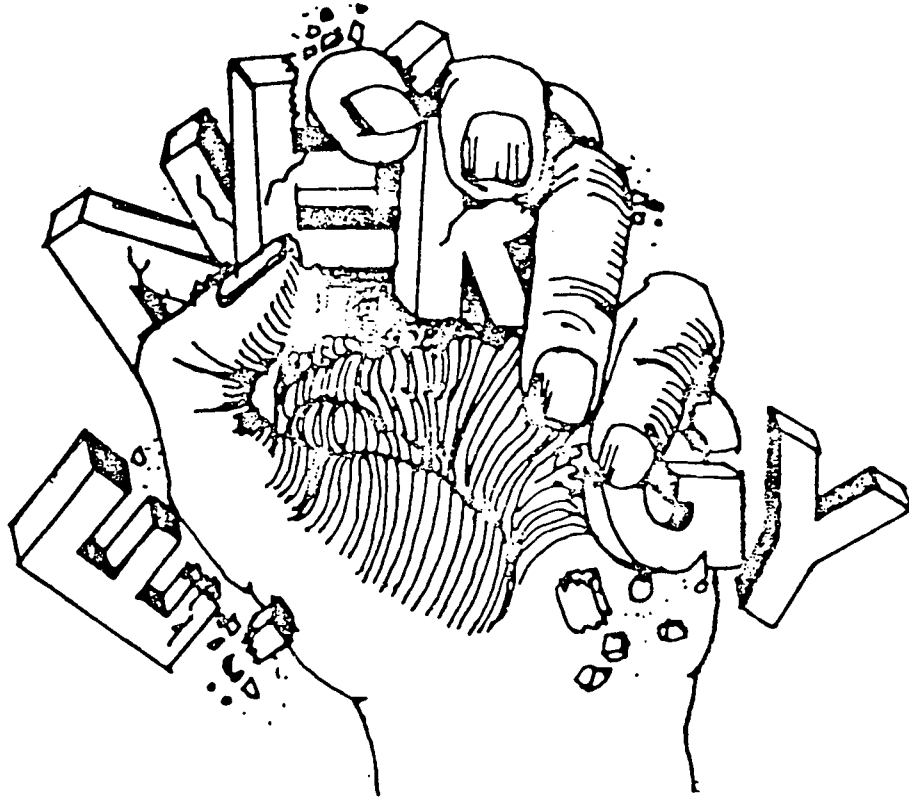
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HOW TO GET MAXIMUM PERFORMANCE FROM YOUR



ACKNOWLEDGEMENTS

Georgia Power Company

Texas Electric

The Electrification Council

American Gas Association

Department of the Army

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CHAPTER 1

GENERAL INSTRUCTIONS

PART A: GUIDANCE

1000. PURPOSE. To provide guidance and information on the application and use of food service energy conservation procedures and to emphasize energy conservation through proper operation and maintenance of food service equipment.

1001. RESPONSIBILITIES

1. The Utilities Conservation and Appraisal Board at each activity is responsible for implementing energy conservation projects and methods.
2. Energy conservation shall be included as a specific item to be examined during local food service inspections.
3. Energy consumption shall be considered as a factor in future design, construction, and procurement of new equipment.
4. Energy management shall be included as a specific topic to be discussed during local food service training programs.

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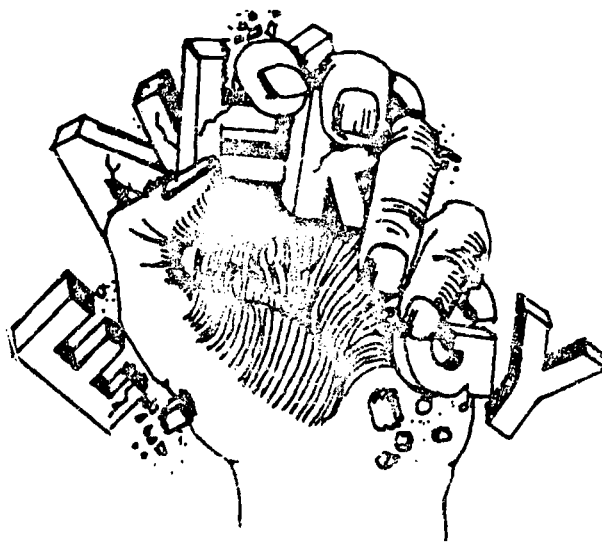
PART B: ENERGY MANAGEMENT

1020. CONSERVING ENERGY. Simply turning off a light or piece of cooking equipment, when not required, is conserving energy. However, before we can attempt to start an aggressive energy conservation program, it is important that we understand the utility rate structure.

1. Most utility companies charge for kilowatt peak demand. Utility companies must have the generating capacity to meet all our energy demands. Although peak demands occur infrequently, the generating capacity must always be available. When not in use, the equipment and distribution capability must be maintained, repaired, and ready for immediate use. These represent an expensive investment for the utility company. The company requires the Marine Corps, as its customer, to share this expense based on our maximum energy use at anytime during the year as well as on our actual day-to-day consumption.

2. Identifying the energy intensive equipment in our facilities, adhering to proper preheating times, turning off equipment when not required, and scheduling use of equipment should enable you to reduce your peak demand requirements.

3. The results of energy management will be difficult to measure, in most cases not possible, because messhalls are often not separately metered; however, this must not detract from our responsibility to minimize energy consumption.



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CHAPTER 2

ENERGY MANAGEMENT

PART A: PRINCIPLES OF ENERGY MANAGEMENT--COOKING

2000. COOKING EQUIPMENT. In today's environment, the messhall manager needs to be ever more knowledgeable in energy usage to help reduce energy consumption. Personnel must be able to use energy efficiently. Here are some energy management principles or techniques concerning cooking equipment:

1. Preheat only the equipment or portion of the equipment that will be used.
2. Preheat equipment just before using, as specified.
3. Reduce temperature or turn equipment off during slack periods of the day.
4. Use full production capacity of equipment when possible or practical.
5. Select the correct size of equipment for the cooking job.
6. Use cooking equipment as recommended by the manufacturer.
7. Maintain equipment in good repair.
8. Keep equipment clean and schedule cleaning to prevent energy waste.

There is nothing complicated about these ideas. Any food service specialist can easily learn to follow them. All the individual has to do is think about what the food production requirements are going to be for a particular meal preparation period.

2001. APPLYING PRINCIPLES OF ENERGY MANAGEMENT

1. Preheat Only the Equipment That Will Be Used. To apply the first energy management principle, the messhall manager must schedule the food production requirements, cooking on as few pieces of equipment as possible. The manager must give

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some thought to the variety and quantities of food to be cooked and the time required to cook each. It may also be possible to finish some foods requiring short cooking cycles, such as gravies, on the same equipment after cooking some foods requiring longer cooking cycles, but which can be and are normally held for a longer period of time before serving.

2. Preheat Equipment Just Before Using

a. To apply the principle of preheating equipment just before using, requires the mess manager/cooks to know how much time is required to preheat each piece of equipment to operating temperatures. The preheat time may vary not only for each type of equipment, but also for some of the different models of the same types of equipment. For example, some fryers will preheat to operating temperature in 4 1/2 minutes, some require 5 minutes, and others require as much as 6 minutes to preheat.

b. The difference in time is often so short that it is not necessary to learn the exact time for each model of equipment. The approximate time required to preheat the various types and sizes of cooking equipment is in the energy operating information tables for ranges, ovens, fryers, griddles, and broilers in the appendixes.

3. Reduce Temperature or Turn Equipment Off During Slack Periods of the Day

a. Slack periods of the day mean after the three principal meal periods are over. During slack periods, a good energy management practice is to turn the cooking equipment off or set the controls back to a lower temperature.

b. Table 1-1 on Electric Fryer Energy Operating Information shows that less than one-half of the energy is required to maintain a fryer at 200°F than at an operating temperature of 350°F. It also shows that the time to recover from 200°F to 350°F is only 2 minutes for the smaller fryers. If a food service operator has several fryers, one may be left on, idling at operating temperature, set one back to 200°F, and turn the rest of them off. The same thing could be done with griddles, ranges, and convection ovens.

c. At first glance, it would seem that it would require less energy to allow a griddle to idle at operating temperature than to allow it to cool and have to preheat it again in an hour; this is not the case.

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d. It will take the average griddle 2 1/2 to 3 hours to cool down to room temperature from an operating temperature of 400°F.

e. Using the 36-inch, 12 kilowatt griddle as determined by the equipment identification plate, the energy saved if the griddle were cooled down to room temperature could be calculated as follows:

$$\begin{aligned}\text{Savings} &= 1,808 \text{ watts/hours} \times 3 \text{ hours} - 2,400 \text{ watt-hours} \\ &= 5,424 \text{ watt-hours} - 2,400 \text{ watt-hours} \\ &= 3,024 \text{ watt-hours}\end{aligned}$$

Making this calculation for the other types of cooking equipment would produce similar results. The conclusion is that energy can be saved, and it would be a good management practice to turn equipment off anytime that doing so does not interfere with production requirements.

4. Use Full Production Capacity When Possible or Practical

a. Cooking at full production capacity of the equipment means cooking full loads on every cooking cycle. It also means cooking one load right after another. This prevents wasting energy during the cooking cycle and maintaining part of the equipment, such as, one-half of an oven cavity, idle at operating temperature.

b. It is good management to load and unload equipment as fast as possible--this reduces the total time that equipment must be heated for each meal cooking period.

c. If foods requiring different temperatures are to be baked in the same equipment, one following the other, the foods requiring the lowest temperatures should be cooked first if practical.

d. The question arises as to when it is/is not practical to cook at full production capacity of equipment one load right after another. Foods cooked to order and foods having a short life in the finished state must be cooked to fit the demand. This may include such foods as fried and scrambled eggs, fried potatoes, pancakes, steaks, etc. It may not be practical to cook these foods at the full production capacity of the equipment. The equipment used to cook foods to order and foods with short finished life most often are fryers, griddles, and broilers.

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e. Equipment may be used to full production capacity when cooking foods that may be cooked ahead of time, or partially cooked and held to be finished later. This may include breads and to some extent, chicken and pork. Foods only partially cooked may include hamburger patties and steaks.

f. Ovens, both deck ovens and convection ovens, are usually used to cook foods ahead of time. Partial cooking of foods may be done in ovens and later finished on griddles.

5. Select the Correct Size of Equipment for the Cooking Operation

a. Selecting the correct size of equipment for each particular operation simply means using the small item if only small loads are to be cooked, rather than preheating a large one.

b. In the case of griddles, ranges or ovens, only the number of sections needed should be used.

6. Use Equipment Properly

a. Probably the greatest waste of energy in cooking, except for leaving equipment idling at operating temperature, is improper use of equipment. This is also a cause of improperly finished food products which also waste energy because some of the foods must be thrown out and more foods cooked.

b. To assure efficient heat transfer from hotplates and french plates of ranges, and hearths of deck ovens, only heavy flat-bottomed pots and pans should be used. Pans that are bent or warped not only waste energy, but also result in uneven finishing of the product.

c. On french plates, the pot should cover the entire surface of the plate and not extend over the edge of the french plate more than 1 inch.

d. Ovens are designed to accommodate standard size bake pans properly. When smaller pans are used, the oven is not being used to its full production capacity.

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e. Proper loading and unloading of foods into or on equipment is important. Overloading the fryer basket so that part of the food is not submerged, results in part of the load to be thrown away or an inferior grease soaked product being served.

f. Placing pans too close to the sides, back, or front of ovens causes poor circulation of hot air in the cavity, resulting in improperly cooked foods, wasted food, and wasted energy.

g. Excessive opening of oven doors or frequent peeking into the oven wastes heat and may result in a poor quality product. Slow loading and unloading of ovens, especially convection ovens, causes not only a waste of heat but may cool the oven down enough to cause a poor product.

h. Loading ovens and fryers before they have become completely saturated with heat can also result in a poor quality finished food product.

i. An open damper on a deck oven will allow hot air to escape out the back resulting in an excessive intake of cold air through the breather space at the front below the door. This will cause the product to be unfinished at the front and overdone at the back of the oven. Dampers on deck ovens should never be opened except when baking foods that contain an excessive amount of moisture, such as fruit pies and cobbles. A collection of moisture on the glass or at the top of the oven door indicates excessive moisture and the damper should be opened just enough to get rid of the moisture. One-fourth of the way open is usually enough.

j. Do not perform a cooking function on a piece of equipment that was designed especially for some other function. An example is placing a stockpot on a griddle instead of a range. A griddle is not designed to be efficient in heating a stockpot; the range is.

k. When specialized equipment can be used, it will do the cooking job more efficiently than conventional equipment. Using steam-jacketed kettles or compartment steam cookers instead of stockpots on top of the range is a good example. Sometimes bread and buns are toasted on a griddle rather than

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the more efficient toaster. Large quantities of hamburgers can be finished in a convection oven with less energy than cooking them on a griddle. It must be noted, however, that there may be a slight difference in the finished product when it is cooked in the alternative or specialized equipment. The method to select often depends on how the messhall manager wants the finished product to look and taste.

1. Microwave ovens are sometimes misused or misapplied by trying to cook large quantities of food from the raw to done state. Microwave ovens can be used most efficiently for reheating, and only occasional cooking from the raw to done state of small quantities of food toward the end of the serving period.

7. Maintain Equipment in Good Repair

a. All equipment will operate more efficiently if it is kept in good repair (in accordance with the manufacturer's operating instructions). If a switch, thermostat, contactor, or heating element fails on a piece of equipment, it will not operate properly until it is repaired. There are some things that can happen to cooking equipment that may not take it out of service, but will affect its performance (waste energy and improperly finish foods).

b. To keep equipment from malfunctioning, thermostat bulbs and capillary tubes should be properly fastened in place. They can be visually inspected in ovens and fryers without any difficulty. A loose thermostat bulb on a range or griddle will cause erratic heating. Thermostats should also be checked periodically with thermometers.

c. Oven doors can be easily checked to be sure they are closing properly. A tight door seal is not as important on convection ovens as it is on deck ovens, but excessive leakage will waste energy.

d. Burned out indicator lamps should be replaced so that the cook can tell if the equipment is on and when it has reached the desired operating temperature.

e. Because of expansion and contraction due to heating and cooling, heating elements sometimes become loose on the griddles and ranges. It is not easy to check but the loose element problem can be easily recognized. On griddles, and ranges in particular, the preheating will be slow and inefficient. Griddles may have hot and cold spots because of

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the inefficient transfer of heat. Hot and cold spots on griddles can result in wasting food, time, and energy.

8. Keep Equipment Clean and Schedule Cleaning to Prevent Wasting Energy

a. Cooking equipment will use less energy if it is kept clean. Spillage and splatters should be cleaned as they happen throughout the day. (CLEAN AS YOU GO.) This will make the equipment easier to clean later. Burned-on spillage and food particles will result in poor performance of the equipment and produce an inferior or unacceptable product. For example, large spillage on the hearth of a deck oven will act as insulation and cause uneven transfer of heat to the bottom of a baking pan.

b. Particles of food that are burned onto the griddle may stick to the next load of food causing it to be wasted. Excessive buildup of burned-on food particles on a griddle will cause uneven heat transfer and can result in unacceptable products. Unnecessary or excessive cleaning by burning off of the heating elements on fryers will also waste energy.

c. The grease in fryers should be kept clean. This prevents a poor finished food product which in turn may require cooking more food. Fans on convection ovens should be kept clean to provide maximum air delivery and assure even heating throughout the oven cavity. It is also important to keep the breather space below the door on deck ovens clean. This allows for expansion of air when it is heated and prevents the door from being forced open which in turn results in uneven baking and energy loss.

d. Cleaning of equipment should be scheduled so as not to require using additional energy in the cleaning process. For instance, clean equipment before it cools down, if it is the type that is easier to clean when it is warm.

e. The cooking surface of a griddle is easier to clean if it is cleaned before it cools much below 200°F. The grease chute and drip tray are easier to clean if done before the grease congeals.

f. When commercial oven cleaners are used, requiring a hot oven for cleaning of the exterior surfaces and around the door, they should be applied while the oven is still above 200°F. If only a damp cloth or mild detergent is required for cleaning the oven, it can be done easier if the oven is allowed to cool. Convection ovens are best cleaned when they are cool enough to handle comfortably.

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PART B: PRINCIPLES OF ENERGY MANAGEMENT--EQUIPMENT

2020. REFRIGERATION EQUIPMENT. Refrigerators and freezers work more hours than any other equipment in the galley. Good energy management requires applying the following principles:

1. Make sure that door gaskets are cleaned and fit snugly.
2. Place refrigerated and frozen foods into refrigerator or freezer immediately upon receipt.
3. Do not place hot foods in refrigerator or freezer.
4. Do not open doors frequently or hold them open for long periods of time.
5. Keep evaporator coils or walls free of excessive frost.
6. Keep condenser coils free of dust, lint, or obstructions that tend to reduce air circulation.
7. Make sure equipment is not located in a hot environment.
8. Maintain equipment in good repair.

2021. APPLYING ENERGY MANAGEMENT PRINCIPLES

1. Make Sure Door Gaskets Are Clean and Fit Snugly. We have seen the dollar bill test demonstrated for testing a refrigerator or freezer door gasket. In this test the bill is placed on the refrigerator mullion and the door is closed on it. If the bill is held securely in place by the door gasket, it is considered to fit snugly enough. The test should be made for the entire length of the gasket. If it is not held securely, the door should be adjusted and/or the gasket replaced. In the absence of a bill, a 3 X 5 card or other piece of paper may be used. Visual inspection will also sometimes reveal a worn or deteriorated door gasket. Gaskets should be maintained properly and kept clean and free of food particles.

2. Place Refrigerated and Frozen Foods Into Refrigerator or Freezer Immediately Upon Receipt. If frozen and refrigerated foods are allowed to remain on the loading dock or in the receiving area, they will absorb heat and then require more energy to cool to the desired or safe holding temperature.

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3. Do Not Place Hot Food in Refrigerator or Freezer Unless Absolutely Necessary. Food should be cooled as near to room temperature as practical before placing it into the refrigerator.

4. Do Not Open Doors Frequently or Hold Them Open for Long Periods of Time

a. When doors are opened, cold air escapes from the refrigeration unit and is replaced with warm moist air. The warm air adds heat and the moisture increases frosting of the evaporator.

b. To eliminate frequent opening of doors, all of the foods that will be needed for a meal preparation should be removed at the same time. The same applies to placing foods into the units. The foods should be assembled on a cart or a table near the door of the refrigeration equipment so that they can all be quickly loaded at the same time. Food should be so placed that it is easily accessible for quick removal. Some foods can be identified more quickly if they are placed in see-through containers. Adequate lighting and clean lenses on lighting fixtures will help in finding desired foods more quickly.

5. Keep Evaporator Coils Free of Excessive Frost

a. Walk-in and some reach-in or roll-in refrigeration equipment use a bank of evaporator coils to pick up heat from inside of the refrigerator or freezer. Many of the reach-in or roll-in units have evaporator coils wrapped around the outside of the interior wall and pick up heat through the walls of the unit.

b. Ice or frost collected on the evaporator coils or the walls acts as an insulator for the coils and makes it more difficult for the refrigerant to pick up the heat from inside of the refrigerator or freezer. Some units automatically defrost every 24 hours. Others must be defrosted by turning the compressor off periodically. Defrosting should be performed when approximately 1/4 of an inch of frost or ice has accumulated on the coils and before circulation of air through the coils is hampered. Keeping foods in covered or sealed containers helps to prevent moisture from escaping from the foods and reduces the amount of moisture that collects on the evaporator coils.

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6. Keep Condenser Coils Free of Dust, Lint, or Obstructions That Tend to Reduce Air Circulation

a. It is natural for condenser coils to attract dust and lint and also it seems natural for people to stack boxes, cartons, etc., around the condenser coils of refrigerators and freezers.

b. Anything that reduces air circulation through and around the condenser reduces the efficiency of the unit and thus wastes energy. Fan blades that are dusty are also less efficient in delivering air through the coils.

c. Dust may be removed with a brush but the best tool is a vacuum cleaner. A vacuum cleaner picks up dust for easy disposal, rather than scattering it around the galley and depositing part of it back on the coils.

7. Make Sure Equipment Is Not Located in a Hot Environment.

Refrigeration equipment should not be placed near heat generating equipment. If it must be so placed, it should be shielded to prevent or reduce the effect of the heat generating equipment. Some galley makeup air may be brought in around the refrigeration equipment. When refrigerators and freezers are located in a separate room or when the compressors and condensers are remotely located in a separate room from the galley, the room should have adequate ventilation and the air should circulate freely. If the condensers are located out-of-doors, they should be shielded from the hot sun and kept free of obstructions such as weeds or grass.

8. Maintain Equipment in Good Repair. Equipment always works better and more efficiently if it is kept in good repair. This includes keeping drive belts properly adjusted and replacing them when they are weak. Suspension springs should also be replaced when they become weak. The equipment should be kept fully charged with refrigerant. When a unit is low on refrigerant, it will run excessively and fail to cool the inside of the refrigerator or freezer to the desired temperature.

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PART C: PRINCIPLES OF ENERGY MANAGEMENT FOOD PREPARATION AREA

2030. KITCHEN VENTILATING SYSTEM

1. Food preparation areas have a special ventilating system. A hood is placed over the cooking equipment to remove smoke, vapors, food odors, and heat generated by the cooking processes.
2. The design rates for air flow through the food preparation area ventilating system are prescribed by law. These same rates are recommended by the National Fire Protection Association. They are: Wall hood - 100 CFM/sq. ft. hood face; Island hood - 150 CFM/sq. ft. hood face; Shelf hood - 300 CFM/sq ft (length of shelf).
3. Air must be brought into the food preparation area to replace the large amounts of air that are exhausted. Some of this makeup air is brought in from the dining areas, but most of it is brought into the galley directly from the outside. The outside air may have to be heated in the winter and cooled in the summer. In some cases the air is cooled with evaporative equipment and in other cases with refrigeration equipment.
4. The heating and cooling of large amounts of makeup air wastes energy. This is especially true if the makeup air is cooled with refrigeration equipment.
5. The codes do not say that the ventilating equipment must be operated at full capacity or at the prescribed ventilating rates. They just state that "it must be so designed."
6. Also, these design criteria make no distinction between gas and electric equipment.
7. Common sense also tells us that when there is little or no cooking, it is not necessary to ventilate the galley at the full design rate. Larger ventilating systems may have more than one exhaust fan. Only the fans needed to remove the smoke, vapors, food odors, and heat generated at any one time need be turned on. In case of a single fan system, a two-speed or three-speed fan can reduce the exhaust air flow.

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8. The few energy management principles applicable to galley ventilating systems are simple to apply. They are:

- a. Operate only the number of exhaust fans required to capture cooking vapors and smoke.
- b. Operate two-speed fans or three-speed fans at the lowest speed required to capture cooking vapors and smoke.
- c. Turn fans off when not needed.
- d. Keep filters clean to assure proper flow of air through ventilating system.

2031. APPLYING ENERGY MANAGEMENT PRINCIPLES

1. Operate Only the Number of Exhaust Fans Required To Capture Cooking Vapors and Smoke

a. The ventilating system should be operated with the smallest number of fans which will capture all of the food cooking vapors and smoke. It can be assumed that the latent heat will also be captured and removed. The manner and location of the makeup air supply, and the types and location of cooking equipment will be determined by experimenting with the operation of the system.

b. When forced makeup air is used for the galley, certain makeup air fans should be interlocked electrically with certain exhaust fans. Thus, when a fan is turned off to reduce the amount of air exhausted, the makeup air will be reduced by the same amount.

2. Operate Two-Speed or Three-Speed Fans at the Lowest Speed Required To Capture Cooking Vapors and Smoke. Many single fan ventilating systems do not have a two-speed or three-speed fan. The cost of changing the fan should be weighed against the energy savings by operating the system at a lower ventilation rate. Most of the savings would be in the heating and cooling of makeup air.

3. Turn Fans Off When Not Needed. It makes sense to turn exhaust fans off when they are not needed to remove smoke and vapors, or to keep the galley cool. The natural updraft through the ventilating hood will provide some ventilation for the galley. It may be enough to capture the smoke and vapors with limited cooking.

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4. Keep Filters Clean To Assure Proper Flow of Air Through the Ventilating System

a. Filters should be kept clean to assure a free flow of air through the system.

b. When grease extractors are used in a ventilating system, there is no cleaning problem, except for emptying the grease receptacle and wiping down the hood at the end of the day. Manufacturers of these grease extractors claim that the extractors will not accumulate enough lint, dust, and grease to require washing more than once or twice each year.

c. When filters are used (older installations), they must be cleaned as often as necessary. Although cleaning of the filters is a messy job, it is a simple operation. The filters may be removed and put through the dishwasher anytime the system is shut down. The frequency of washing filters depends on the cooking operation; it may vary from approximately once per week to once per month.

ENERGY CONSERVATION IN MESSHALLS

CHAPTER 3

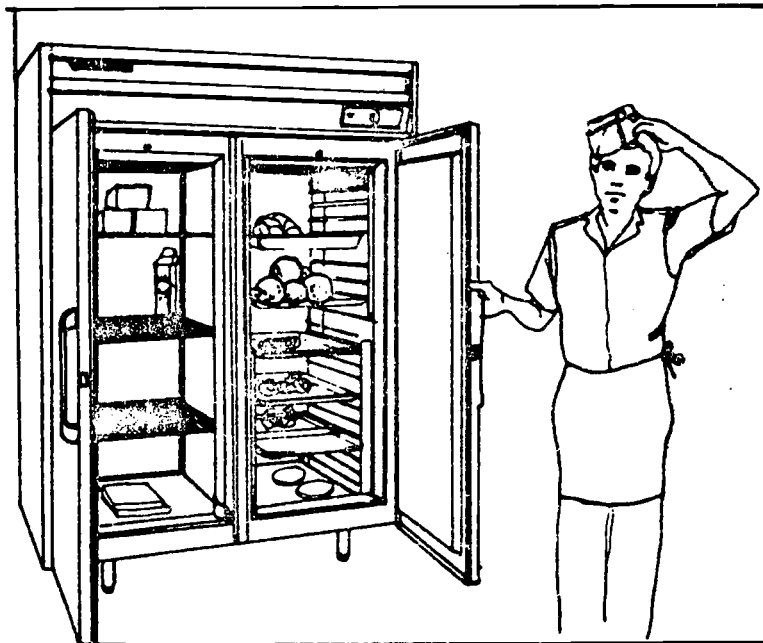
ENERGY MANAGEMENT ANALYSIS

3000. ENERGY USAGE. Before you implement the energy conservation guidelines in this booklet, it is suggested that you review your present patterns of energy usage to determine where your conservation efforts might best be directed.

1. This chapter contains an equipment questionnaire, checklist, and energy consumption record sheet. Record on the consumption sheet, the number of hours each day you normally use each piece of equipment. Record the electrical power load or gas requirement for each. This information should be found on the manufacturer's nameplate along with the model and serial number. Note the equipment that requires a lot of power and is used extensively. This equipment should be your top priority for conservation measures.

2. Most of the suggestions or procedures in this booklet are pointed toward electrically heated equipment. These same procedures should be applied to gas-heated equipment.

3. Completing the questionnaire (paragraph 3001) and energy consumption record sheet (paragraph 3002) and analyzing them, are the first steps in establishing your energy conservation program.



"Know all your needs before opening door."

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3001. ENERGY ANALYSIS-COOKING EQUIPMENT

<u>Major Type of Cooking Equipment</u>	<u>Number</u>	<u>Major Type of Cooking Equipment</u>	<u>Number</u>
Ranges	_____	Fryers	_____
Deck Ovens	_____	Griddles	_____
Convection Ovens	_____	Broilers	_____
Microwave Ovens	_____	Other	_____

<u>Operating Procedures</u>	<u>Yes</u>	<u>No</u>
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Are only essential equipment items preheated?	_____	_____
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Suggestions: _____

Is the equipment being preheated just before it is going to be used?	_____	_____
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Suggestions: _____

Is temperature reduced or equipment turned off during slack periods of the day?	_____	_____
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Suggestions: _____

Is the full production capacity of equipment used?	_____	_____
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When practical, are ovens fully loaded for each baking cycle?	_____	_____
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Is another load put on right after one has been removed?	_____	_____
--	-------	-------

Suggestions: _____

ENERGY CONSERVATION IN MESSHALLS

Operating Procedures--Continued

Yes No

Is the correct size of equipment used for the cooking operation?

Suggestions: _____

Is equipment used properly:

Are pots and pans with flat bottoms used on range hotplate and hearths of deck ovens?

Do pots used on french plates cover the entire surface of the plate?

Are fryer baskets sometimes overfilled?

Are standard sized pans used in ovens to prevent waste of space?

Is care taken to space pans an equal distance from walls (sides, front, and back) of convection ovens?

Is a timer used in baking operations to prevent opening of oven doors unnecessarily?

Is the deck oven damper closed, except when baking very moist products?

Are microwave ovens being used for large quantity primary cooking functions?

Suggestion: _____

Maintenance of Equipment

Yes No

Are indicator lights working on all of the equipment?

Are indexes and numbers on control knobs clearly visible?

ENERGY CONSERVATION IN MESSHALLS

Maintenance of Equipment--Continued

Yes No

Are thermostat bulbs and capillary tubes properly fastened in place on fryers and deck ovens?

Do oven doors close properly?

Are there light and dark spots on griddle surfaces indicating a burned out or loose element?

Are thermostats periodically checked?

Figure 1

Suggestions:

Cleaning of Equipment

Yes	No
-----	----

Is equipment kept clean?

Is spillage cleaned up as it happens throughout the day?

Is there buildup of food on hearths of deck ovens, griddling surfaces, and grates of broilers?

Are heating elements kept clean on fryers?

Is the breather space on deck ovens clear of crumbs or other food particles?

Are contact surfaces on ovens and oven doors clean so that doors will close properly?

Suggestions:

ENERGY CONSERVATION IN MESSHALLS

3002. ENERGY CONSUMPTION RECORD SHEET

Equipment Item	Electric Load, Gas Requirement	Hours Used Per Day	Remarks
Revolving Ovens			
Deck Ovens			
Dishwasher			
Fryers			
Tilt Grills			
Ranges			
Convection Ovens			
Exhaust Hood			
Griddles			
Hot Food Tables			
Warming Cabinets			
Heat Lamps			
Water Heaters			
Kettles			
Dishwasher Exhaust			
Steam Cookers			
Coffee Equipment			
Toasters			
Indoor Lighting			
Outdoor Lighting			
Air-Conditioning			

ENERGY CONSERVATION IN MESSHALLS

CHAPTER 4

HINTS FOR ENERGY CONSERVATION

4000. DO'S AND DON'TS

1. Ranges, Open Burner or Hot Top

- a. Always cover cooking vessels to retain heat and decrease cooking time.
- b. Cook at lowest practical heat. Turn down when product begins to boil. Higher heat does not decrease effective cooking time.
- c. Gas flame should not engulf cooking vessel.
- d. On electric ring elements, use proper size cooking vessel, approximately 1 inch larger than ring.
- e. On hot top ranges, group vessels as close as practical to use as little surface area as possible.

2. Ovens, Deck, Conventional, and Convection

- a. Preheat only when necessary and for minimal length of time at the correct thermostat setting.
- b. Higher thermostat setting does not effectively decrease preheating time.
- c. On ovens with glass panel doors, do not leave light on. This will shorten bulb life and is an excessive use of energy.
- d. Use timers when roasting or baking. Keep the frequency of door opening to a minimum.
- e. Load ovens to full capacity. However, allow at least 2-inch clearance for circulation on conventional and deck ovens. Convection ovens require less clearance due to force air system.
- f. Schedule baking and roasting so that products requiring lowest thermostat setting are started first.
- g. When practical, use electric ovens during off-peak hours.

ENERGY CONSERVATION IN MESSHALLS

h. Turn ovens off when not in use. Do not let oven run at low temperature until needed.

i. Do not use two ovens when one will do the job.

j. Load and unload ovens quickly. Do not allow oven to stand with doors open.

3. Fryers

a. Preheat to manufacturer's instructions. Do not set thermostat higher than cooking temperature. A high setting does not effectively decrease the preheat time.

b. Maintain proper level of fat in tank. Filter and replace fat as necessary.

c. Do not overload baskets. Normal capacity is 1/2 or 2/3. Overloading increases cooking time.

d. Use stainless steel covers. This will decrease cooking time, help to keep fat clean, and lighten the load on ventilation and air-conditioning.

e. Fry at lower temperature when practical to conserve energy and increase the life of shortening.

4. Steam Cookers

a. Be sure compartment doors seat properly. Loss of steam is loss of energy plus increases load on ventilation and air-conditioning systems.

b. Turn off when not in use. There should be little or no preheat time.

c. Cook to full capacity. Energy consumption is the same for small or large batches.

5. Kettles and Skillets. Always use covers; this retains heat, decreases cooking time, and lightens the load on ventilation and air-conditioning.

6. Griddles

a. For small batches, heat only the required portion of the griddle surface.

b. Use the entire heated surface when possible.

ENERGY CONSERVATION IN MESSHALLS

c. Grill at lowest practical temperature. Higher temperature does not effectively decrease cooking time and lowers the quality of product.

7. Refrigerators and Freezers, Reach-In and Walk-In

a. Load and unload as quickly as possible.

b. Schedule work so that several items can be taken out of refrigerator or freezer to minimize door opening and loss of refrigeration.

c. Turn off lights in walk-in when leaving. All units should have outside pilot light indicators.

d. Install proper size bulbs in all units. Maximum 25-watt in reach-in and 60-watt in walk-in.

e. Clean condensers at least once a month. More often in bakery. Keep condenser area clear for air circulation.

f. Label items when necessary for quick locating and unloading to keep door openings to a minimum.

g. Keep door opening clear to allow proper latching and sealing.

h. Replace worn door gaskets and defective handles.

i. Be sure remote condensing units are cool areas. Open doors and windows where practical.

j. Do not store products to block air flow from evaporator coils.

k. Be sure automatic defrost freezers are set to defrost during off-peak hours.

l. Do not allow ice to build up more than 1/4-inch thick on manual defrost freezers. Turn off to defrost (never chop off ice).

8. Steam Tables, Wet Heat, Gas, Electric, or Steam

a. Do not overfill table. Inserts do not have to come in contact with water.

b. Fill with hot water when practical.

ENERGY CONSERVATION IN MESSHALLS

c. Never leave openings uncovered during preheating or serving. This causes loss of heat and an extra load on ventilation and air-conditioning systems.

d. Preheat only as long as necessary. Time depends on size of table of heat. Time and check with thermometer.

e. These tables are for holding hot food at serving temperature, not for cooking. Temperature in excess of 180°F is a waste of energy.

f. Keep water pan clean. Do not allow calcium or lime to buildup. These act as insulators and reduce efficiency. Could lead to pan burn out.

9. Dishwashers

a. Always load machine to full capacity. Half full racks are a waste of energy.

b. Do not operate machine at temperatures in excess of instructions. Proper temperatures are normally marked on thermometer gauges.

c. Remove and clean wash arms regularly. A clogged wash arm will cut efficiency.

d. Do not leave pumps running when not actually washing.

e. Check water pressure from booster to final rinse. Low pressure will not rinse thoroughly and high pressure will waste water.

f. Keep heating coils and tank free from calcium or lime buildup.

g. Check pump housings for leaks. This will waste water and reduce efficiency of pumps.

h. Consult with local supplier of dishwashing compounds and solutions for water and energy tips for your particular machine and system.

i. Be sure arm or lever which activates final rinse cycle is turning on and off with each rack. Continuous running of final rinses wastes energy and water. Turn off the booster heater when not in use.

j. Wash cups and glasses in compartment racks if you have a flight type dishwasher.

ENERGY CONSERVATION IN MESSHALLS

10. Hot Water Heaters

- a. Periodically, drain water heater to remove sediment that acts as an insulator and reduces heater efficiency.
- b. Turn down water heater temperature. Hot water should not have to be cooled at faucet for normal use. Temperature normally should be 140°F.
- c. Insulate hot water lines where practical.
- d. Booster heaters should be as close as possible to dishwasher to prevent heat loss through pipes.

11. Ventilators

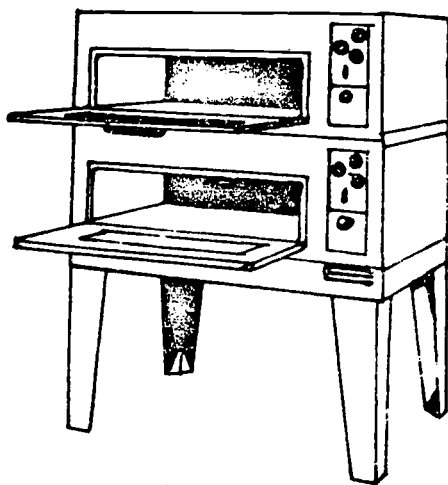
- a. Exhaust ventilators should not run continuously. Start when cooking or baking begins. Turn off approximately 1 hour after you are finished cooking.
- b. Remove and clean filters once a week. It may be necessary to clean filters over fryers more often. Most filters are small enough to be run through dishwasher with other loads.
- c. Where practical, install dampers to shut off portions of the ventilator hood when equipment below is not in use.
- d. Turn off interior hood lights when equipment is not in use.
- e. Do not operate dishwasher ventilator until machine has reached operating temperature; this will draw heat from machine and prolong preheat time.

12. Miscellaneous

- a. Check all gas-fired equipment for proper flame. An uneven or yellow flame indicates a need to adjust air mixture and to clean the burner.
- b. Check calibration of all gas and electric thermostats and thermometers. Recalibrate if necessary.
- c. Check all faucets for leaks and repair as required.

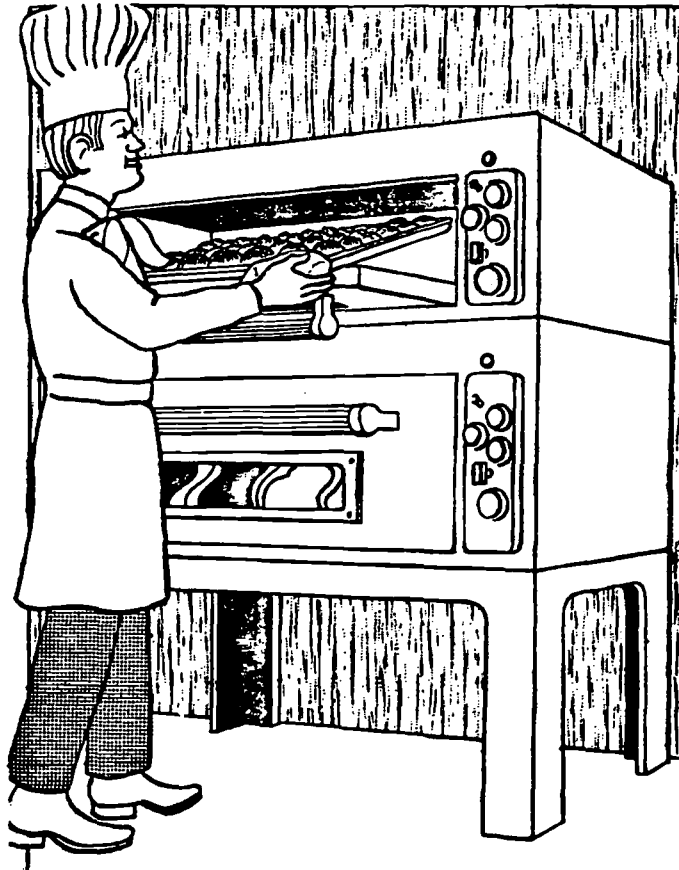
ENERGY CONSERVATION IN MESSHALLS

All of these suggestions are mainly common sense. They are good management and efficient energy conservation practices that should be followed everyday by everyone. It is important that all equipment be maintained in first-class operating condition. Equipment that becomes inefficient due to poor maintenance can easily offset other efforts made in the conservation of energy.



"Ovens are for baking and roasting, not for use as warmers."

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR DECK OVENS



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ENERGY CONSERVATION IN MESSHALLS

BAKING GUIDE

Note: Data in this chart is of a general nature. Experience will dictate variations that best fit your baking requirements.

PRODUCT	TEMPERATURE	TOP SWITCH	BOTTOM SWITCH	TIME MINUTES
Two Crust Pies	400-425	Med.	High	40-60
Open Face Pie	400-425	Med.	High	35-50
*Pumpkin Pie	375-400	Med.	Med.	35-50
*Custard Pie	375-400	Med.	Med.	35-50
Meringue Pie (Browned)	425-450	High	Off	5-6
Parker House Rolls	400-425	Med.	Med.	20-30
Danish Rolls	375-400	Med.	Med.	20-30
Sweet Rolls	375-400	Med.	Med.	20-30
Tea Biscuits	375-400	Med.	Med.	20-25
Corn Bread	400-425	Med.	Med.	25-35
Layer Cake	350-375	Med.	Med.	20-30
Angel Cake	300-325	Med.	Med.	40-50
Puddings	325-375	Med.	Med.	35-60
Pizza (pre-prepared)	500	High	High	5
Pizza (fresh)	500	High	High	15

* Used when crust and filling are baked as a unit. When crust is pre-baked and filling only is to be baked, most bakers use a temperature of approximately 300-350°F.

MEAT ROASTING GUIDE

SWITCH SETTINGS: For best results, set both oven switches on HIGH, with the temperature control at the indicated setting. Measured top heat provides excellent coloring and a caramelized finish to meats, but where a browned appearance is not desired (as in roasting fowl), the upper oven switch should be set to MEDIUM, LOW, or OFF.

FULLY THAWED TYPE OF MEAT	TEMPERATURE SETTING	INTERNAL MEAT TEMP. DEG. F.	MINUTES PER LB.
Beef			
Standing Rib 7 Rib 20-25 lbs.	300°	Rare 125° Med. 140° Well 150°	13 15 17
Rolled Rib 7 Rib 16-18 lbs.	250°	Well 150°	25
Rump or Chuck 18-23 lbs.	300°	140-170°	20-30
Lamb			
Leg 7-8 lbs.	300°	180°	30-35
Shoulder	300°	180°	40-45
Pork			
Ham Leg 15 lbs.	350°	185°	30-35
Ham Boned 15 lbs.	350°	185°	30-35
Boston Butt	350°	185°	45-50
Cured Ham 20 lbs.	300°	160°	15-18
Veal			
Leg 25 lbs.	300°	170°	18-20
Shoulder 15 lbs.	300°	170°	25
Shoulder Rolled 10 lbs.	300°	170°	35-40
Poultry			
Chicken, Dressed 4-6 lbs.	250-300°	190°	35-40
Duck, Dressed 5-8 lbs.	300°	190°	25-30
Turkey, Dressed 14-19 lbs.	300°	190°	20-25

NOTE: The above data is of a general nature. Many factors such as size of bone, thickness of meat, temperature at time of roasting, individual taste as to degree of doneness, etc., must be taken into consideration by the chef. Pan selection and cooking times will also be governed by total weight and number of pieces. Use a meat thermometer to check internal meat temperatures.

ENERGY CONSERVATION IN MESSHALLS

ROASTING AND BAKING WITH PRECISION CONTROL

Modern ovens are sized for all types of operation. They come in, one-, two-, four-, and six-pan sizes (based on 18-inches by 26-inches roll pans).

The one-pan size can be used independently, singly, or stacked though it is usually an integral part of your oven. The two-pan size is used in most operations. It can be stacked in up to three sections. The four- and six-pan sizes are applied to big volume baking.

The one-pan size is designed for all purpose work (roast and bake). The two-pan model ovens come in all purpose and bake models; both types can be stacked in combination. (The door opening in all purpose ovens is about 4 inches higher.) Most two pan models feature windows and interior lighting.

A simple control panel on all models includes two reversible three-heat switches (high, medium, and low) governing top and bottom heat; a thermostat dial to pinpoint temperatures for 200°F to 500°F and a signal light. Some models also feature a mechanical timer. A damper control lever regulates moisture and releases cooking vapors through a vent.

Inside, tubular heating elements are located at the top of the chamber and under the deck. Removable decks may be of steel, tile or corplate, according to make and model. Some models feature aluminized steel inner walls; others are porcelain lined. Six-sided insulation of the chamber minimizes heat loss.

The instructions that follow apply only to the types of ovens just reviewed. They are general in nature, so it is strongly recommended that you study and carefully follow the manufacturers' manual for the individual make and model in your kitchen.

HOW TO INCREASE EFFICIENCY

You'll increase efficiency if you -

- * Stagger preheat periods of oven sections and use a minimum of electricity for other purposes while preheating.
- * Preheat to cooking temperature.

ENERGY CONSERVATION IN MESSHALLS

- * Load oven decks to capacity at one time (small loads are uneconomical.)
- * Keep lower edge of door free of charred food particles.
- * Clear decks of carbonized foods after each loading.
- * Start day's baking with products that require the lowest temperature.

And here are some important "don'ts"

- * Never use water for cleaning the oven decks or electrical parts.
- * Don't connect oven to exhaust ducts.
- * Don't open damper more than necessary to carry off steam - it may cause uneven baking.

(If performance is off, have the oven checked by your maintenance or public works department.)

HOW TO USE YOUR OVEN

If your oven is new, clean off the decks with a soft brush. To release any paint fumes or moisture content, set the thermostat at 300°F and the other two switches at medium. Leave for 6 to 8 hours -- with the damper wide open.

Preheating. Set both top and bottom switches to high and thermostat at no higher than the temperature required. The signal light will glow until the selected temperature is reached. Keep the door and damper closed while preheating. Prepare pans for loading. Preheat time (to 350°F) is about 20 minutes. To assure optimum heat saturation of the oven chamber, allow approximately an additional 20 minutes before loading.

Loading. Load quickly to prevent heat loss from the open oven door. Position pans in rows from rear to front of oven starting from right wall. Pans should not touch each other or the walls of the oven; at least a two-inch clearance is needed to permit air circulation between and around pans. Close door and set the timer.

Racks. Where intermediate oven racks are used for baking (in all-purpose ovens), it is usually necessary to increase the bottom switch setting and time. If both rack and deck are loaded, it may be necessary to move the pans (rack to deck and deck to rack) when one-half to two-thirds done to obtain desirable top and bottom browning.

ENERGY CONSERVATION IN MESSHALLS

Don't Peek. Because your electric oven is automatically controlled to deliver exact heat distribution, guesswork is eliminated. Excessive door opening disrupts the temperature pattern and increases operating cost. If you have to peek, use the window.

Steam Control. If steam escapes around the oven door, open the damper just enough to stop the stream at the door.

CLEANING CARE

Spillage spots on oven decks may cause uneven baking. Clean the decks after every loading with a stiff wire brush or a spatula. Never use water or a soaking wet rag to clean the oven chamber. However, a cloth lightly dampened with a mild detergent may be applied to porcelain liners.

Steel decks may be scoured at the pot sink. After scouring, lightly coat with fat and season in the oven at 450°F for about 30 minutes. This will lessen sticking of spillage and inhibit rust.

Removable corplate decks should be brushed regularly after loosening spillage. Turning the decks over once a month will keep them new and clean looking.

If food deposits clog bottom edge of the doors, the oven will lose efficiency. So clean off such deposits before they harden.

Wash all exterior surfaces at least once daily with warm water and a mild detergent. Clean stainless steel with a damp cloth, then polish with a soft dry cloth.

Enamel surfaces can be polished with any good silicone-base polish. Plastic controls can be washed, dried, and polished with a soft cloth.

Enamel finish touch-up kits are supplied by restaurant equipment dealers.

Table 1-1. Energy Operating Information

ELECTRIC DECK OVEN

ENERGY OPERATING INFORMATION

Type Oven	Size	KW Input	Minutes to Preheat	Watt-hours to Preheat	Watts/Hour to Maintain				
					300°F	350°F	400°F	450°F	550°F
All-Purpose	1 Pan	6	20	2,000	487	594	702	810	
All-Purpose	2 Pan	6.2	36	3,720	531	649	767	88	
Bake	2 Pan	6.2	30	3,100	510	623	737	850	
Bake	4 Pan	7.5	90	11,250	660	807	953	1,100	
Bake	6 Pan	11	120	22,000	1,020	1,247	1,473	1,700	
Pizza	6 Pizza (2 Pan)	7.2	45	5,400	4.0	507	599	691	875
*Polythermic Bake	2 Pan	6.2	30	3,100	510	625	740	860	
*Polythermic All-Purpose	2 Pan	6.2	36	3,720	535	650	770	890	
*Polythermic Pizza	6 Pizzas	7.2	45	5,400	410	510	600	695	885

* Plus 1/8 H.P. motor for circulating air.

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR

PRESSURE FRYERS



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ENERGY CONSERVATION IN MESSSHALLS

YOUR PRESSURE FRYER

Pressure fryers are sometimes mistakenly confused with pressure steam cookers.

Actually, the pressure frying process resembles that performed in regular "open" deep-frying equipment. The difference is that the cooking chamber is sealed during the frying operation.

Pressure is generated by steam escaping from the food while cooking. As the moisture causing the pressure comes from the food itself, pressure fryers need no water or steam connections.

The clue to the high performance index of pressure fryers is volume production combined with rush hour speed. The potential in these machines is usually realized from massive production of a single specialty. Quality deep fried chicken, for example, is an ideal result obtained from this type of equipment.

The performance scope of pressure fryers, however, is not confined to chicken.

They are extremely versatile, and can be applied with excellent results to many other foods -- fish and meats, potatoes, and vegetables.

Although pressure fryers are easy to operate, some models are fully automatic and they represent a sophisticated design advance, and should be treated with care.

Proper fat care, too, is of vital importance; for the frying fat can be likened to the life's blood of the machine.

To assist operators in obtaining maximum performance from their pressure fryers, this easy-to-follow guide is presented.

It should be noted, however, that there are several makes on the market, each with its own design characteristics. Consequently, readers should study the operating instructions issued by the individual manufacturer.

ENERGY CONSERVATION IN MESSHALLS

BREADING BRIEFS

In pressure frying breaded foods (chicken, cutlets, seafoods), use a breading that will not only produce a fine golden brown crust, but also provide a protective covering and reduce fat absorption.

Many methods of preparing food products for pressure frying are satisfactory, but it's wise to choose a breading method that will allow for advanced preparation. This will keep you ahead during rush hour traffic. A good method will also prevent excess breading from dropping off in the fat. The density of the breading material used must be in balance with time and temperature.

One recommendation is to marinate chicken 10 minutes before breading.

Bread lightly with a seasoned coater and place the chicken on a tray covered with a damp cloth. Keep the chicken pieces apart. If stacked or touching, the breading will cling from one piece to another. Leave the tray in the refrigerator to permit the breading to set before frying the chicken.

Chicken should not be breaded over 10 hours before frying. If left overnight, wash it, pack it in ice flakes and rebread the next day.

If frozen chicken is used, thaw before breading. Never bread chicken with just flour. Unregulated flour does not impart the fine flavor produced by a good seasoned coater. Also, flour may tend to hasten fat breakdowns.

OPERATING GUIDE

Be sure that nameplate voltage on your fryer matches your own electrical supply, or malfunction may occur. Also check that you have properly sized capacity fuses or circuit breakers.

An exhaust hood should be provided to remove steam exhaust and frying odors. (Refer to local ventilating codes.) The exhaust hood should be high enough to permit clearance of fryer cover in the fully raised position.

Fryer should be leveled when all connections have been made.

ENERGY CONSERVATION IN MESSHALLS

All pressure fryers have a control panel that can be mastered at a glance. According to make and model, your fryer will have an On-Off power switch with signal light, a thermostat control with signal light (some models are activated directly by the thermostat control), a timer, a pressure gauge, and a pressure relief switch.

On manual models, the cover and basket are worked by hand. On fully automatic models, the cover action and basket (lift and lower) function automatically at push button control once the timer has been set. One model has a motor switch on the control panel which starts the automatic sequence after the timer has been set.

Preparing to Fry

The drain valve must be closed before pouring fat into the cooking chamber.

If you use a solid shortening, melt it before filling the fryer. Fill to the leading edge of the fat level gauge (or marker).

Always use a vegetable hydrogenated shortening. Never use drippings, lard, or suet.

Never turn the fryer on when the heating elements in the chamber walls are exposed, or damage will result.

When the fryer is filled, set the thermostat to the desired cooking temperature (usually 300-325°F) and preheat the fat. The thermostat signal light will go out when dialed temperature has been reached.

Next, place pieces of chicken (or other product) individually into the basket after it has been lowered into the fat. Load the basket uniformly and evenly to prevent pieces from sticking together. Be sure that all food is covered by the fat.

Do not load food beyond the rated capacity of your individual model.

After loading the basket, close the cover and turn the handle to seal the cooking chamber. Set the timer for the recommended cooking cycle.

ENERGY CONSERVATION IN MESSHALLS

On automatic, the basket and cover mechanism are activated by the push button (or motor switch).

When the cover is sealed, pressure rapidly builds up (9 to 12 lb, according to make and model), and is recorded on the pressure guage.

A bell (or buzzer) announces the completion of the cooking cycle. A glance at the time during cooking will tell you how long you need to wait before your next load is ready.

At the completion of the cooking cycle, the steam exhausts automatically through an escape valve. During cooking, a pressure relief value maintains pressure with safe limits.

DO NOT OPEN THE COVER UNTIL THE PRESSURE GAUGE ON THE CONTROL PANEL HAS DROPPED TO 0.

Use tongs or mitts to raise the basket.

Hang the basket on the side of the cooking chamber to drain before unloading.

On automatics, the cover will self release and the basket will pop up at the close of the cooking cycle.

Fat Care

The quality of the food you serve depends largely upon proper fat care.

Check fat level between each cooking cycle. Add fresh fat if level has dropped below the marker.

To protect the fat, do not hold at cooking temperature when your pressure fryer is not in use. Reduce to "idle" or switch off. Reheat can be accomplished in 10 minutes or less.

Frying breaded foods demands frequent fat filtering.

A good habit is to filter the fat after 85 to 90 lb of frying. Use a good vacuum type or gravity type filter. Cheesecloth alone is not adequate.

Some models are equipped with their own filtering systems. Otherwise, there are several excellent devices available.

ENERGY CONSERVATION IN MESSHALLS

Follow the manufacturer's instructions for the particular filtering device you use.

Before starting to filter, switch power off and open the drain valve.

While the fat is out of the kettle, wipe the heating elements to clean off any accumulated breading. Remove any excess breading or other particles from the bottom of the cooking chamber. Keep the drain valve clean.

Watch the fat for off flavors. Taste it daily. Always discard the fat as soon as it shows sign of foaming.

CLEANING CARE

The quality of the food you serve from your pressure fryer also depends upon a disciplined cleaning program. The following daily routine is recommended:

- * Switch power off.
- * Drain all fat from the cooking chamber, and close the drain valve.
- * Fill the cooking chamber with a mild solution of water and detergent to the fat gauge level (or marker).
- * Boil for a few minutes, then brush -- with the solution inside -- with a fiber bristle brush. Never use steel wool or abrasive cleaners.
- * Drain the solution, then rinse with clear hot water.
- * Refill with water and add a half-cup of white vinegar to neutralize the alkaline left by the cleaning solution.
- * Bring to a boil, drain, and again rinse with clear hot water.
- * Thoroughly dry the cooking chamber.

CAUTION: Do not return fat to the fryer until the cooking is not trapped in the drain valve or filter valve nipple.

IMPORTANT: Never switch on the power unless the fat chamber is filled with either fat or water, or damage to the heating elements will result.

ENERGY CONSERVATION IN MESSHALLS

Clean all exterior surfaces of your fryer with a mild solution of water and detergent. Rinse dry, and polish with a soft cloth.

Make sure that the underside of the cover is kept thoroughly clean. Be careful that the gaskets do not come into contact with any sharp object.

The exhaust chamber (where installed) should be drained daily as part of the clean up routine.

The solenoid should be dismantled and cleaned once monthly. (Refer to manufacturer's instructions.)

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR **ELECTRIC HOT FOOD HOLDING EQUIPMENT**

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ENERGY CONSERVATION IN MESSHALLS

QUALITY FOOD SERVICE MUST BRIDGE THE TEMPERATURE GAP BETWEEN COOKING AND SERVING

A quality food service system must bridge the temperature gap between cooking and serving. Obviously, it is highly undesirable to let cooked foods stand--and cool--prior to serving. Apart from quality loss, there's a temperature "danger zone" (40°F to 140°F) where bacteria thrive and multiply.

Thus, to enable operators to serve hot foods hot, equipment manufacturers have evolved a wide assortment of devices to the needs of every type of service situation.

These devices are known variously as "food warmers, "hot food servers" or, generically, as "hot food holding equipment." Their function is to maintain temperatures of cooked foods in the proper range of 150°F-250°F as controlled by setting of a thermostat dial. Different types of food, of course, have their own ideal serving temperatures.

As hot food wells (in serving lines), pass-through units (between kitchen and serving lines), standing or mobile cabinets, drawer units or other types, electric hot food holding equipment is universally easy to operate and to keep clean.

Because of the wide diversity of makes, models, and types, the use and care procedures outlined on the following pages are offered only as a general guide. For specific guidance, operators are recommended to apply the instruction issued on their own equipment.

OPERATING GUIDE

Your hot food holding equipment may not perform properly if connected to a voltage other than specified on the nameplate. This caution applies particularly to mobile units when plugged in at remote locations.

The equipment requires from 16 to 60 minutes to preheat according to make and model (check manufacturer's instructions). Set the thermostat control at desired temperature. A signal light will glow until the preset temperature is reached and will cycle on and off as the thermostat automatically maintains the present temperature.

ENERGY CONSERVATION IN MESSHALLS

On most models the thermostat control also acts as the "on and off" switch. (Setting the thermostat at a higher temperature than required will not increase the speed of preheating.) Keep the device closed while preheating, then load quickly to minimize heat loss.

When you are holding several types of food with different suggested temperature settings, set the thermostat at 185°F for best results.

NOTE: Some models are controlled by numbered temperature (1-10) on dial. Refer to manufacturer's instructions.

When the equipment is at operating temperature, the electric current cycles only as needed to maintain temperature. Under normal operating conditions, current is used only part of the time.

The storage of various types of food requires different degrees of moisture, which can be adjusted by the moisture control -- which ranges from MOIST TO CRISP. When preheating, set at CRISP.

When set at MOIST (example: for soft rolls), the moisture is sealed in the drawer or compartment. When set at CRISP (example: hard rolls), fresh air circulates within drawer or compartment.

For best results, temperature and moisture settings must be adjusted to the type of food being stored (refer to manufacturer's instructions). NOTE: Drawer models feature independent moisture controls.

Some cabinet models are thermostatically controlled (140°-185°) and feature a removable hot unit assembly. A blower circulates air throughout the cabinet to keep temperature uniform. Moisture is provided by a water reservoir. A timer (up to 10 hours) automatically shuts off the unit beyond the attended period.

Variations in methods of baking or ingredients used in foods can affect control settings. A study of results at various settings can determine the best adjustments for your particular needs.

Larger quantities of rolls and foods will hold for longer periods than smaller loads.

ENERGY CONSERVATION IN MESSHALLS

Though some hot foods can be held for several hours, the recommended average should not exceed 2 hours -- long enough for most serving cycles.

CLEANING CARE

Your hot food holding equipment should be cleaned daily.

Do not use scouring pads or other abrasives on either interior or exterior surfaces.

Apply a moist cloth -- or, if necessary, use water, mild soap, and a clean soft cloth. Dry thoroughly. A solution of ammonia and water will cut grease film. Do not allow spilled food to harden on any part of the device. When spillage occurs, remove it promptly, and wipe the surface with a clean, damp cloth.

Removable parts (racks, drawers, etc.) should be taken out daily for thorough cleaning in soap and water.

All parts of the moisture control system should be inspected daily to prevent any accumulation of crumbs or food particles.

When the equipment is not in use, leave the door (or drawer) open to permit air circulation.

Remember, clean equipment not only meets the highest sanitation standards, but also operates at maximum efficiency.

INFRARED UNITS

More and more facilities are using infrared equipment (lamps, rods or tubes) to hold hot foods at ideal serving temperatures.

The constant radiant heat from infrared sources at a distance of 10 to 18 inches from hot foods assures quality results.

When used over a steam table, infrared keeps meats roasting hot. Creamed dishes or gravies will not skim over.

If the food is kept under the units for no longer than an hour, dehydration will be a negligible factor.

Infrared units are as easy to operate as an electric light and simply wiping them daily with a damp cloth will generally keep them spotlessly clean.

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR

RANGES

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ENERGY CONSERVATION IN MESSHALLS

YOUR RANGE IS A MULTI-PURPOSE KITCHEN MACHINE

Heavy-duty commercial electric ranges are built like battleships. In fact, they have been specified by the U.S. Navy since before World War I. They are designed by the most look-ahead engineering brains in the country to meet the demands of versatility, flexibility, space control, rapid clean up time, and return on investment -- through high productivity and long life with minimal servicing.

However, just as a battleship requires care and proper handling, so does your electric range. Attention to the instructions in this manual will reward you with maximum range performance. While these instructions are generally applicable to all makes and models, you are strongly urged to refer to the manufacturer's manual on your range.

Commercial electric ranges are designed with a variety of cooking tops with sectional heat controls; rectangular hot plates, round French hot plates (tubular hot plates on some models), and griddles.

Range tops may be mounted on oven or cabinet bases, or on steel stands with 18-inch legs to bank with other cooking equipment modules. This last arrangement permits maximum access for underneath cleaning.

SURFACE CAPABILITY OF YOUR RANGE

Your range tops can be used for specific cooking operations as determined by your menu.

The rectangular hot plates are designed for heavy stockpot work: soups, stews, sauces, gravies.

French hot plates are for short order processing, individual sautéing or braising.

The griddle top handles eggs-ham-bacon breakfast production in addition to hamburgers, pancakes, and other griddle specialties.

The number of portions to be served from either a multi-item or limited menu determines the range capacity needed for meal peaks, in terms of number and combination of range tops.

As a guide a standard 36-inch range with 3 rectangular hot plates should handle surface cooking for about 250 meals. One round French hot plate can produce 15 to 20 portions of

ENERGY CONSERVATION IN MESSHALLS

braised or sauteed items in a 10-minute cooking cycle. A 36-inch by 24-inch range griddle top accommodates at least 50 eggs or hamburgers per load.

For smaller facilities catering for about 100 people per meal, the medium-duty "Restaurant Range" is adequate. This also features combination tops and base ovens. The medium-duty range is much more serviceable for small operations than the household range, which is not constructed to withstand commercial-type operations.

OPERATING YOUR ELECTRIC RANGE

Your range top may be equipped for sectional heat control with any of these types of switches:

- * Thermostat switches govern temperatures of 12-inch by 24-inch rectangular hot plates. These feature a neighboring signal light which goes on while preheating, goes off when dialed temperature has been reached.
- * Three-heat (high, medium, low) switches governing either 12-inch by 24-inch rectangular hot plates or round (French-type or tubular) hot plates.
- * Infinite-heat switches (dial progressively from low to high) controlling either rectangular or round hot plates. These do not supply thermostatic control and are not equipped with signal lights.

Before use, identify the types of switches on your range and the corresponding surface sections that they control.

Thermostatically controlled hot plates should be set for high temperatures for stockpot cooking. They can also be set for lower temperatures for griddling and saute work. But first preheat by setting thermostat switch to required temperature and wait until the signal light goes out before setting cold utensils on the hot plates.

For round surface units controlled by three-heat or infinite-heat switches, preheat on high setting for about 10 minutes, then reduce to medium or low -- or whichever setting is appropriate to the cooking operation on hand. Avoid leaving hot plates on high heat for extended periods of time when not in use.

ENERGY CONSERVATION IN MESSHALLS

Round tubular heating elements, of course, can be judged visually as they progress from dull red to cherry red, according to the switch setting.

- * Season the hot plates before using for griddling work. (See manufacturer's instructions.)

TIPS FOR SURFACE COOKING

Typical pot-and-pan work entails rapid changes from high to low heats. With versatile range tops, you can set different sections at different temperatures and just shift utensils from one section to another when you need to change the speed of cooking.

Sauteeing: Heat a small amount of fat in a frying pan. When fat is hot, switch to low heat and add food. Brown evenly on both sides.

Pan Frying: Heat frying pan on high setting. Rub hot pan lightly with fat or suet to prevent meat from sticking. Brown on both sides. Pour off fat as it accumulates.

Stewing. Season meats and add liquid, using covered pan. Leave on high heat until food reaches cooking temperature, then switch to low for the slow cooking that produces tender foods.

Braising: Meats can also be braised in a covered pan on your range top or in the range oven.

Stockpot Work: Use high temperature setting until steam flows freely from the edge of stockpot cover, then switch to low to continue cooking. If you are following a recipe, start timing when food reaches to boil

(NOTE: Stockpots of over 20-quart capacity should not be used on round French hot plates.)

Griddling: See section pertaining to griddling.

Before using your range for the first time, apply a wax-base polish to protect enameled walls from dirt and wear. This will make future cleaning easier.

- * Wash all enamel walls daily with a soft cloth, using warm water and a mild detergent. Follow with a clear rinse, then dry. This will ward off hard-to-remove grease accumulation.

ENERGY CONSERVATION IN MESSHALLS

- * Remove grease stains with a mild nonabrasive scouring powder. Rub lightly until stain is gone. Rinse and dry. When dry, touch up with wax.
- * Clean polished steel surfaces with a damp cloth and polish with a soft dry cloth. Remove discolorations with a nonabrasive cleaner.
- * Wash, dry, and polish knobs and switches with a soft cloth. Avoid gritty soaps for harsh cleaners.

Rangetops

- * Rectangular hot plates should be scraped with a flexible spatula after each use.
- * Round French hot plates can be kept clean after cooling by scouring with a damp cloth and mild abrasive. Remove spillage deposits with fine pumice stone, then rinse and dry.
- * Important: Baked on spillage acts as a barrier between cooking surfaces and pots, reducing efficiency of hot plates. So clean your hot plates as recommended after every use.
- * Round tubular heating elements (on most models) will burn themselves clean. Brush off any excess carbon and clear removable reflector pans of grease accumulations.
- * Spillage drawers or drip trays should be wiped frequently with a damp, soapy cloth, rinsed and dried.

COST CUTTING HINTS

Vegetable cookery requires only a small amount of water. Two cups are enough for 10 lbs of potatoes. More water wastes time and energy and soaks out valuable food contents. As soon as a pot reaches the boil, switch to a lower heat setting. You can't get water any hotter than 212°F no matter how much heat is applied! Always use nonwrapped utensils with flat bottoms, straight sides, and tight fitting lids. Arrange pots and pans on hot plates so that as much space as possible is covered. This prevents heat loss around side of utensils. It also prevents foods from sticking and scorching.

ENERGY CONSERVATION IN MESSHALLS

Table 1-1. Energy Operating Information
ELECTRIC RANGE

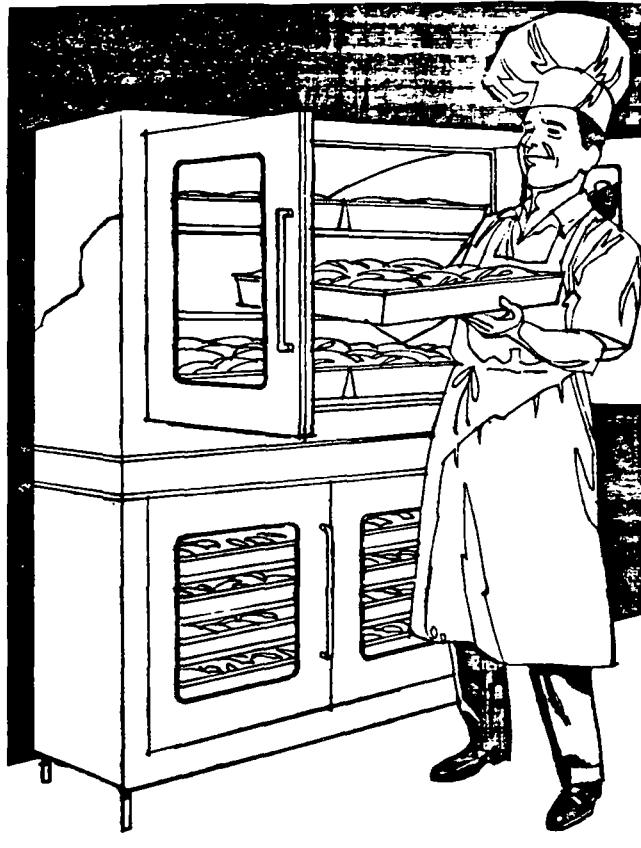
ENERGY OPERATING INFORMATION						
Types Of Cooking Tops	Manufacturer's Nameplate KW	Minutes to Pre-heat to 400°F		Watt-hours To Preheat To 400°F		Watts/Hour** To Maintain At 350°F
Divided Top	15.3	12		3,060	7,650	2,200
French Plates	10-12	3		500-600	1,333-1,600	200-300*
Griddle Top	16.5	12.5		3,438		2,160

*Each french plate on low setting.

**Also, low setting with three heat and infinite heat switches.

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR

CONVECTION OVENS



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ENERGY CONSERVATION IN MESSHALLS

CONVECTION OVENS ADD A NEW DIMENSION TO BULKY

The convection oven has added a new dimension to bulk cookery in that it can turn out substantially more food in about 30 percent less floor space than a standard deck oven.

The motor-powered blower in a convection oven constantly circulates heated air across and around racked food. This action accelerates heat absorption, shortens cooking time for most foods, and lowers cooking temperatures by about 50 degrees for conventional foods of the same density. Roasting meats, for example, at lower temperatures helps to reduce shrinkage, promoting significant economies.

The convection oven is versatile; it can be used to roast, bake, and reheat and will accept standard pans or convenience foil packages.

There are a wide number of makes, sizes, and types. For ease of reference, this manual will apply primarily to standard six-rack models. Even so, the directions that follow are necessarily of a general nature, though designed to provide a helpful guide to successful convection oven operation.

For specific instructions on your own convection ovens, you are strongly recommended to study and apply the manual issued by the individual manufacturer.

GENERAL FEATURES OF SIX-RACK MODELS

The standard six-rack oven is, in many models, adjustable to hold up to 11 racks.

Single oven sections may be mounted on legs, a storage stand, or a cabinet base. Two sections may be decked.

Some models feature vertical doors; others favor the horizontal design.

The control panel on your convection oven is equipped with the following:

- * Main control switch (for on-off power supply). Some models have a light to indicate the power is on.

ENERGY CONSERVATION IN MESSHALLS

- * A thermostat dial, ranging up to 500°F, that controls the temperature.
- * Interior light switch.
- * Vent control (to release steam from high-moisture food products).
- * Signal light (on during preheat, off when set temperature is reached).
- * Load control (on some models, governs the amount of heat and time it will take to return to the selected thermostat setting with a specific load).
- * Timer dial for 60 minutes. Some models additionally feature a 5-hour timer.
- * In most models, the oven works only with the power on and the doors closed; the oven deenergizes automatically when the doors are open. However, some models feature an independent blower switch to permit cooling of oven with doors open, and a motor reset button if fan should stop through electrical overload.

OPERATING HINTS

Position the racks according to the cooking load to be prepared.

- * On models with an independent blower switch, snap on the power switch with the doors open. If the blower starts, depress the blower switch so that it only operates when the doors are closed.
- * On all other models, close the door before snapping on the power switch.
- * Set the thermostat dial to the required temperature. The signal light will go on.
- * You can now preheat the oven in 10 to 15 minutes to reach temperatures from 300-400°F.
- * If so equipped, preheat with the load control set at high.

ENERGY CONSERVATION IN MESSHALLS

- * The oven should not be loaded for baking until the signal light has flashed off and on at least twice.
- * To preheat for baking, set the temperature 50°F higher than required to compensate for heat loss when opening the doors for loading. Adjust to the correct temperature after loading. Then set load control dial (if so equipped) to the correct setting for the product and load to be cooked (see manufacturer's manual).
- * Always load quickly to conserve heat, centering the pans on the racks. With light bake products, it is advisable to position pans as far as possible from the blower mechanism to reduce spattering.
- * Care should be taken to avoid spillage of batter or liquids while loading.
- * Cooking action starts as soon as you close the doors. Set the timer.
- * The timer does not control the oven function, so check for doneness as soon as the bell or buzzer sounds.
- * Avoid unnecessary door opening during cooking; it disrupts the temperature pattern. Observe cooking progress through the door windows. Use interior oven lights only when necessary.
- * You can roast beef, lamb, poultry, and ham in a convection oven at 225-325°F; pork at 325-350°F. When roasting, place a pan of water at the bottom of the oven. This supplies humidity to reduce shrinkage.
- * Load and unload rapidly to conserve heat.
- * Unloading is easier if the racks are pulled forward.

CLEANING CARE

Stainless steel exterior surfaces should be wiped down daily with a damp cloth. Stubborn soil may be removed with a mild detergent solution.

- * Do not use scouring pads or scouring powder on any exterior finish or on the door window; damage will result.

ENERGY CONSERVATION IN MESSHALLS

- * Use a mild detergent solution on enamel finishes. An occasional application of a silicone-base auto polish will help to maintain a "like new" appearance.
- * Racks and rack supports may be removed and cleaned at the pot sink. Some models feature a removable drip pan to catch spillage. This may be emptied and cleaned at the pot sink.
- * Interiors may be lined with porcelain, aluminized steel, stainless steel, or Teflon. Where removable (see individual manufacturer's instructions), these liners may also be cleaned at the pot sink.
- * If not removed, liners (except Teflon) should be brushed with a stiff brush or, if necessary, scraped with a spatula to loosen spillage, and swept clean.
- * Never use a soaking wet rag or pour water in the interior of the oven.
- * Wash, dry, and polish plastic control knobs with a soft cloth.
- * Check frequently for hardened food particles or accumulation of carbon, especially around the oven doors. If doors do not close tightly because of such deposits, heat is wasted and the oven will not operate sufficiently. Also, an ineffective door seal permits a constant escape of steam, which condenses and deteriorates the finish around the oven front and door lining.
- * After processing some foods at low temperatures, odors may linger in the oven. These odors may be cleared by running the oven fan for 10 to 15 minutes.
- * To clean blower mechanism, consult individual manufacturer's instructions.

ENERGY CONSERVATION IN MESSHALLS

SUGGESTED COOKING GUIDE

FOOD	TEMPERATURE SETTING (°F.)	TIME SETTING (Minutes)	NO. OF RACKS*
Frozen fruit pies	350	45-50	5 (20 pies)
Fresh apple pies	350-375	25-30	5
Sheet cake (5 lbs/pan)	335	18	5
Beef pot pies	400	30-35	5
Turkey pot pies	400	10	5
Toasted cheese sandwiches	400	10	5
Fish sticks	335	16-18	11
Chicken back or wing	350	35	5
Chicken (quarter)	350	30	5
Lamb chops	400	6	5
Sugar cookies	300	15	5
Baked potatoes	400	50	5
Hamburgers (5 lb well done)	400	16	11
Pizza (7" frozen-preheat pans)	435	11	6
Halibut (frozen 5 oz)	350	30	5
Chicken breasts	350	33	5
Macaroni and cheese	350	30	5
Meat loaf	325	40	5

* Where the number of racks is 5, insert the first rack on the bottom position and place the others on every other rung.

Table 1-1. Energy Operating Information

ENERGY OPERATING INFORMATION

ELECTRIC CONVECTION OVEN

Nameplate KW	Minutes to Preheat	Watt-hours to Preheat	*Watts/Hour To Maintenance at 350°F
11	9	1,650	1,917
11	10	1,835	1,800
11	10	1,835	2,100
15.5	9	1,650	2,300

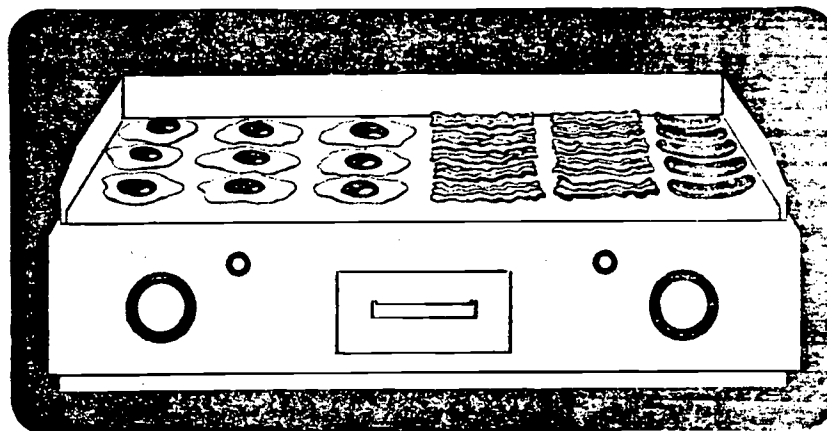
*Various sizes of bake cavities.

ENERGY CONSERVATION IN MESSHALLS

MICROWAVE OVEN

Nameplate Wattage (Operating Wattage)	Watts Output Into Cavity	Watts/Hour To Maintain Idle	Standby Wattage
1,500	650	200	0
2,200	1,000	275	0
2,400	1,000	290	0
3,500	1,300	375	0
5,400	2,700	450	0

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR **GRIDDLES**



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ENERGY CONSERVATION IN MESSHALLS

YOUR PRECISION TOOLS FOR QUALITY GRIDDLING

If you were to put load after load of refrigerated hamburgers on an old-fashioned griddle, the temperature would keep falling until the heat is below cooking level. That's why modern griddles have been engineered to deliver fast preheat and instant temperature recovery. They will accept around-the-clock loads of refrigerated foods in any quantity up to 2,000 hamburgers per hour.

The technology built into automatic griddle-grills is aimed at quality, high-peak production with the least expense of time, labor, and food loss.

Griddles and griddle-grills range from small counter models up to 72-inch-wide production machines, including built-in and range-top types. The counsel on proper use and care offered herein is generally applicable to all makes and sizes. With simple care, your griddles will give you years of carefree service.

MODERN FEATURES THAT COUNT

The energy that is transmitted to the grid plate of your griddle is evenly distributed through scientifically patterned heating elements. The pattern assures overall, edge-to-edge distribution of the exact heat dialed -- no hot spots, no cold spots.

The control dials -- from one to eight, according to model, size, and make -- permit sectional cooking. This means you can economically shut down part of the griddle when traffic is light, or cook different foods at their own required temperatures at the same time, or maintain the entire surface at the same temperature for heavy hamburger or pancake traffic.

The control dials, which usually range from 150°F to 450°F, accurately measure the preset heat. Each dial is accompanied by a signal light that glows during preheating, goes out when correct cooking temperature is reached.

A drain system and removable tray or drawer to collect grease deposits serve to speed up the cleaning chore.

ENERGY CONSERVATION IN MESSHALLS

WHEN YOUR GRIDDLE IS NEW

1. Use the manufacturer's operating manual that came with your griddle. Write for a new manual if yours is missing. Study the manual, then file it in a safe place for ready reference.
2. Check the nameplate on the griddle to satisfy yourself that the voltage and current characteristics match your electrical service.
3. Have your griddle installed and connected by your maintenance or public works department.
4. Clean off the rust preventive compound applied by factory. Use a cloth dampened with a grease solvent. Wipe with a clean, damp cloth. Dry thoroughly.
5. After thorough cleaning, the griddle plate must be seasoned. Preheat to 400°F. Apply a light film of unsalted cooking oil. Allow to stand for 2 minutes, then wipe clean. Repeat this process. Thoroughly wipe off excess oil. Your new griddle is now ready.

CORRECT OPERATING CARE

Turn dial to required temperature (reached when signal light goes out).

With machines having more than one control dial, make sure you know exactly how much of the cooking surface each control serves. (Consult the manufacturer's manual.)

Load and cook according to recipe. Unless the food product contains fat (e.g., bacon), the grid surface must be grease-filmed before each cooking operation.

Turn food halfway through cooking time unless otherwise specified in recipe.

Griddle-grills, with independently controlled upper griddle, cook both sides at once. (One manufacturer recommends that the upper griddle should be approximately 50°F higher than lower griddle temperature to obtain desired browning and doneness.)

ENERGY CONSERVATION IN MESSHALLS

After each cooking load, scrape excess food and fat particles off the griddle surface with a flexible spatula.

During traffic lulls, reduce temperature to "idle" (around 200°F).

At the end of each day's operation, thoroughly clean griddle, reseason, and turn all temperature controls to off.

CLEANING CARE TAKES MOMENTS

- * Once a day -- more often when necessary -- thoroughly clean and wipe out grease troughs. During use, remove any particles that might interfere with proper drainage. Remove grease drawer, empty and wash it in the same way as any ordinary cooking utensil.
- * Once a week -- or daily if necessary -- thoroughly clean off the griddle surface with a pumice or griddle stone (recommend using the griddle screens in General Services Administration, Contract Number GS-005-30661, 3M Brand Griddle Cleaning System). Rub with the grain of the metal while the surface is still warm. Do not use steel wool.
- * After each thorough cleaning, the griddle surface must be reseasoned.
- * At all times, keep the controls, surrounding surfaces, and connecting cables grease-free. Clean with a mild detergent.
- * Use a damp cloth to keep the griddle body clean and bright.

REGULAR MAINTENANCE PROGRAM

Avoid future trouble by setting up a regular maintenance program. Follow these steps:

During cleanup periods, thoroughly inspect your griddle and remove any carbon or hard grease deposits. Report any traces of damage resulting from heavy wear.

ENERGY CONSERVATION IN MESSHALLS

Regularly check your griddle surface temperature with a reliable commercial thermometer against the reading on the control dial. If they don't match, your thermostat may need recalibrating.

Keep records of your maintenance program -- to provide a road map of any functional weaknesses that may develop in your equipment. Prompt repair or replacement of any defective parts will keep your griddle going when you need it most--during peak rush hours.

ENERGY CONSERVATION IN MESSHALLS

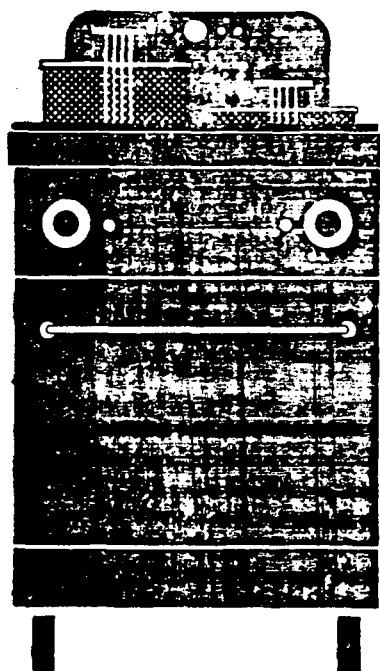
Table 1-1. Energy Operating Information

ELECTRIC GRIDDLE

ENERGY OPERATING INFORMATION

Griddle Size In Width	Nameplate KW	Minutes to Preheat to 350°F 400°F	Watt-hours to Preheat to 350°F 400°F	Watts/Hr. To Maintain 400°F	Watts/Hr. To Maintain 200°F	Minutes to Recover From 200°F to 350°F
18 Inch	3	7 12	350 600	500	200	9
24 Inch	6	7 12	700 1,200	980	390	9
24 Inch	8	7 12 1/2	935 1,670	1,200	480	9
30 Inch	6.5	7 12	760 1,300	925	370	9
36 Inch	12	7 12	1,400 2,400	1,808	725	9
36 Inch	16.5	7 12	1,926 3,300	2,100	840	9
48 Inch	22	7 12	2,570 4,400	2,800	1,100	9
72 Inch	32	7 12	3,735 6,400	4,200	1,800	9

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR FRY KETTLES



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ENERGY CONSERVATION IN MESSHALLS

IT'S EASY TO BECOME AN EXPERT FRY CHEF

Machines are called infallible, yet they still need people to tend to them. The most advanced computer is only as good as its human programmers. So it is with modern food preparation machines. They are designed to attain technical excellence, yet they need human understanding - plus care to render maximum performance.

The information contained herein is designed to help you achieve the total performance values built into your electric fry kettle. At the same time, you'll discover how easy it is to become an expert fry chef.

These procedures apply to all "open" fry kettles.

MODERN FRY KETTLE FEATURES

Modern electric fryers offer these features to provide maximum performance:

Immersion-Heating-Elements

All the heat goes directly into the fat. You get maximum heat recovery even after continual loading of frozen foods and uniform heat distribution throughout the entire frying area. The heating elements on most models are hinged to swing up and out of the fat for easy drainoff and cleaning, and to provide access to liftout fat containers.

Precision Temperature Control

The thermostat on your electric fryer is engineered for critical temperature control and trouble free operation. Accurate temperature control determines the quality of your fried products. The temperature range is 200°F to 400°F. Many models feature a secondary thermostat system to protect against the possibility of overheating.

Signal Lights

A signal light goes on when the thermostat control is activated and automatically goes out when preset temperature is reached. This light will periodically blink on and off as the thermostat cycles (for example, when fresh cold loads are lowered into the fat).

ENERGY CONSERVATION IN MESSHALLS

On-Off Switch

Some models feature a separate on-off toggle switch with signal light that remains on as long as this power switch is in the "On" position.

Removable Fat Containers

You can lift out the fat container on many models for easy cleanup at the pot sink. Some makes feature accessory duplicate fat containers to speed transfer of strained fat to your fryer.

Baskets

The fry baskets supplied with your equipment are engineered not only for hard wear but also to protect your fat against metal contamination. Specialty accessory baskets are now available to provide a wider variety of fried menu output. These include fine mesh for breaded products and shoestring potatoes, compartment baskets for convenience foods and slotted types for fish.

Crump Trays

Some fry wells are fitted with a removable crumb tray that permits removing most food particles without draining the kettle. This can be taken out and cleaned several times daily to keep the fat sediment-free.

Siphon

Many models feature an accessory siphon attachment to speed draining and straining of fat into a suitable receptacle or duplicate fat container. Other portable types of filter systems are also available.

Automatic Basket Lifters

A timer automatically lowers the baskets into the fat and lifts them out again at the end of each timed cycle. This push-button control feature protects you against over or undercooking during rush hours and frees your attention for other duties.

ENERGY CONSERVATION IN MESSHALLS

INSTALLATION CHECKLIST

1. Use the manufacturer's operating manual that came with your fryer. Write for a new manual if yours is missing. Study manual and then file it in a safe place for ready reference.
2. Check the nameplate on the fryer to satisfy yourself that the voltage and current characteristics match your electrical service.
3. Have your fry kettle installed and connected by your maintenance or public works department.
4. Check the adjustable leg balance to compensate for any unevenness of floor or counter. A tilted fat level can hamper performance.
5. The fryer must be thoroughly cleaned and dried off before use.

Whether your fryer is old or new, always use a top grade commercial shortening with a high smoke point and resistance to breakdown. Results: longer fat life and better tasting food.

To Fill Your Fryer

Put in enough fat to cover the heating elements completely. Many models have a marker stamped in the fat container to indicate the proper level. To ensure proper efficiency the fat should be at least 1 inch above the heating.

Liquid Shortening

If you use a liquid fat, fill the kettle to the proper level, then set the thermostat to the recommended cooking temperature.

Solid Shortening

With the heating elements in the lowered position, pack the fat solidly around the heating elements and set the thermostat at 250°F. Continue to pack fat around the heating elements until enough fat is melted to cover the heating elements. Then turn the control dial to the recommended cooking temperature.

ENERGY CONSERVATION IN MESSHALLS

OPERATING YOUR FRYER

Set the thermostat dial for recommended temperature and allow your fryer to preheat. Preheat time from room temperature to 350°F is about 5 minutes.

While preheating, the thermostat signal light will be on. As soon as the preset temperature is reached, the signal light will go off. The precision thermostat will automatically control the fat temperature at this setting until the setting is changed or the power is turned off.

Automatics

Automatic fry kettles are equipped with a separate time control (0-15 minutes) in addition to the temperature control. Both controls should be preset to recommended time and temperature for specific food to be deep fried. On models with "Repeat" button, controls will automatically return to same setting after each load if button is pushed in before you first set time and temperature controls. On models without "Repeat" button, time and temperature setting does not repeat automatically.

To change control setting for foods requiring different cooking times and/or temperature, rotate dials by hand to recommended setting.

To interrupt the cycle (for example, because of an incorrect time setting), rotate the timer dial counterclockwise to 0. The automatic lift mechanism will immediately raise the baskets to the drain position.

Loading

Fry baskets should be loaded to one-half and never more than two-thirds of their capacity. Overloading always results in an improperly cooked product. After loading, lower the basket into the fat on standard models or attach them to the elevator supports on automatic models and press the push button.

Unloading

With manual fryers, to prevent overcooking, be sure to lift out the baskets at the end of the recommended cooking time and hang them for a few seconds on the basket supports provided for draining. Never allow fried foods to hang over the hot cooking oil, foods will become soggy.

ENERGY CONSERVATION IN MESSHALLS

Slack Periods

During slack periods, either turn off your fryer completely or reduce the temperature to "standby" (200°F). You'll get much better mileage out of your fat.

Safety Thermostat

This acts automatically if overheating should occur (above 450°F). On some models a warning light glows. On others the regular thermostat signal light stops blinking to indicate normal cycling, and remains off. If this occurs, switch power off, allow the fryer to cook, switch on, activate the reset button (clearly indicated) and resume frying. If the safety thermostat should again trip after a short interval, switch off and call for assistance from your maintenance or public works department.

NOTE: On some models, the safety thermal system trips a circuit breaker that automatically switches off the power. A reset button is provided to reactivate the device.

Electric fryers are designed to strip down for rapid cleaning. A clean fryer performs better, turns out higher quality foods, and reduces fat costs.

Daily Procedures

- * Switch the power off.
- * Transfer the baskets to the pot sink.
- * Raise hinge type heating elements to the halfway position to drain off for a few seconds, then move them up to the fully raised position until they lock in place.
- * If equipped with an accessory siphon or filter, drain and strain the fat into a clean receptacle (or spare, interchangeable fat container where provided).

If not, strain the fat through several layers of cheesecloth into a clean container. Remember you are transferring hot fat. Use gloves or pot holders to protect your hands. Lift out the empty fat container, if the removable type, and wash it at the pot sink along with the baskets and siphon equipment removable crumb tray, too, where provided.

NOTE: All traces of crumbs or other particles, also soap and moisture, must be cleansed from components before reusing. A water-vinegar solution makes a good rinse. Then rinse again with fresh water. Thoroughly dry.

ENERGY CONSERVATION IN MESSHALLS

Fixed Fat Wells

If your fryer has a fixed fat well, it can be drained with a siphon or through a built in drain system. With drain valve models:

- * Attach a filter bag to the end of the drain pipe and place a clean receptacle below it.
- * Open the valve slowly to avoid splashing.
- * Flush out sediment with a small quantity of hot fat.
- * When empty, close the drain valve and wash the fat well with detergent and hot water. Thoroughly rinse, then drain off and dry.
- * Check that the drain valve is closed before replacing the strained fat.

CLEANING THE HEATING ELEMENTS

Depending on usage of your fry kettle, heating elements should be cleaned at least once weekly or whenever traces of carbonization are noted. Most models are equipped with hinged swing-up elements. However, some types are not movable. As methods of cleaning vary according to make, the manufacturer's recommendations should be obtained for your fry kettle.

Hinged Swing-Up Elements

One method of cleaning commercial electric fry kettles equipped with hinged swingup heating elements is to follow these steps:

- * Drain and clean the fat container.
- * Fill the fat container with water mixed with a good fry kettle cleanser.
- * Lower the heating elements into this solution.
- * Switch on the power and bring the solution to boil.
- * Continue to boil for a few minutes, then switch off the power, and allow to stand overnight if possible.
- * Next day, rinse and dry off the heating elements, rinse out the fat container, then apply a final rinse with a vinegar-water solution.

ENERGY CONSERVATION IN MESSHALLS

- * Make sure the heating elements and the fat container are thoroughly dried off before reloading with shortening. Also inspect for any remaining traces of food particles or carbon before reloading.

Fixed Heating Elements

This procedure is recommended for cleaning heating elements that are not movable:

- * After draining and cleaning out the fat well, fill with a soapy solution.
- * Boil at 250°F or about 20 minutes.
- * Drain the solution, and rinse first with a water-vinegar solution, then with fresh water. Thoroughly dry. Inspect for any remaining traces of food particles or carbon.

IMPORTANT: Treat your heating elements in accordance with the instructions of the individual manufacturer.

Exterior Luster

Clean stainless steel surfaces with a damp cloth and polish with a soft dry cloth. Wash all other exterior surfaces (chrome, etc.) with warm water and mild soap.

Remove all grease deposits (particularly under the hinges of heating elements). Neglected grease accumulations will form into hard-to-remove stains.

PROPER CARE OF SHORTENING

Fat consumption is the costliest part of deep frying. French fries, for example, contain about 10 percent fat, absorbed during frying. Fat cost, therefore, is reckoned in terms of absorption and replacement.

To get top mileage out of fat, observe these simple procedures:

- * After processing some food at low temperatures, odors may linger in the oven. These odors may be cleared by running the oven fan for 10 to 15 minutes.
- * To clean blower mechanism, consult individual manufacturer's instructions.
- * Use a quality hydrogenated vegetable oil.
- * Keep checking your fat level while frying. If low, replenish immediately with fresh fat.

ENERGY CONSERVATION IN MESSHALLS

- * At least once daily (more often if breaded products are used), drain and strain the fat per recommended cleaning procedures.
- * After draining and straining, replenish the container with fresh fat equal to 15 to 20 percent of its rated capacity (for example, add 5 lb to 30 lb container); then complete the refilling with the strained fat. This revitalizes the used fat (5 qts. equal 10 lb).

NOTE: The faster you turn over your fat through food absorption and replenishment, the longer you will ward off fat breakdown. If your fryer is not using at least 15 percent of its rated fat capacity daily through absorption, drain off enough to replenish with at least that much fresh fat.

Avoiding Fat Breakdown

Guard against costly fat breakdown with these simple rules:

- * Always switch to "standby" (200°F) during slack periods.
- * Never add salt or seasoning to food during frying.
- * Do not top up your fat level with meat drippings, lard, or similar fatty substances.
- * Make sure all metal components in contact with the fat are free of contaminants (carbon, crumbs, soap, moisture).

REGULAR MAINTENANCE PROGRAM CAN PREVENT COSTLY SHUTDOWN

- * Avoid future trouble by setting up a regular maintenance program. These simple steps can prevent costly shutdown:
- * During clean up period, inspect all removable components of your fryers - baskets, fat containers, basket supports, crumb trays. Report any components that may need replacement due to heavy wear.
- * Inspect interior of fixed well models for any grease or carbon deposits.
- * Inspect the heating units for traces of carbon deposits. Remove carbon promptly according to recommended cleaning procedures.

ENERGY CONSERVATION IN MESSHALLS

- * Regularly check your fat temperature with a reliable commercial thermometer against the reading on the dial of the thermostat. Where there is a considerable difference between the two readings, your thermostat may need recalibrating.
- * Keep records of your maintenance program. This record should give you a complete operational log of your assigned equipment.
- * Records of operational performance can provide you with a roadmap of any functional weaknesses that may develop in your equipment. Prompt repair or replacement of any defective parts will keep your fryer going when you need it most during peak rush hours.

Find out if your fryer is still in warranty. If so, it's wise to know the terms of the warranty. Most makes of electric fryers are covered for 1 year against defective parts or workmanship.

QUICK TIPS FOR TOP FRYING PERFORMANCE

ALWAYS

- ☐ Make sure fat level is at least one-inch above heating elements.
 - ☐ Add 15 per cent of fresh fat to fryer daily.
 - ☐ Remove loose crumbs from breaded products before frying.
 - ☐ Filter fat at least once daily, more often if breaded products are used.
 - ☐ Thoroughly wash raw potatoes before frying.
 - ☐ Remove excess moisture from raw, wet foods before frying.
 - ☐ Raise baskets to drain position after each frying cycle.
 - ☐ Use quality brand fats, such as pure hydrogenated vegetable oils.
 - ☐ Shake basket several times, while still in fat, when frying small-size foods (potatoes, onion rings).
 - ☐ Size food to be fried in same load into uniform portions.
 - ☐ Lower foods into fat to prevent splattering.
 - ☐ Keep pastry-covered foods submerged during frying.
 - ☐ Turn doughnuts and fritters just once.
 - ☐ Thoroughly clean all parts of fryer at least once daily.
-

NEVER

- ☐ Never let fat level drop below top of heating units.
- ☐ Never overload the fry baskets beyond one-half to two-thirds of capacity.
- ☐ Never push the fryer by setting thermostat beyond recommended temperatures.
- ☐ Never add salt or seasoning during frying—you'll ruin the fat.
- ☐ Never hold for long periods at frying temperature when there is no food in the fryer. Switch to "idle" (200°F.) or OFF.
- ☐ Never leave soap traces in fat container after cleaning.

ENERGY CONSERVATION IN MESSHALLS

33 ITEMS FOR YOUR DEEP-FRY MENU			
	FOOD	Temperature* (F°)	Time* (Minutes)
POTATOES, FRENCH FRIES (3/8" cut)	Raw to Done	350	6
	Blanched, only	350	3
	Browned, only	350	3
	Commercially Treated	350	6
	Frozen, Fat Blanched	350	2
	Potato Chips	350	3-4
	Potato Puffs	360	1½
SEAFOODS	Frozen Breaded Shrimp	350	4
	Fresh Breaded Shrimp	350	3
	Frozen Fish Fillets	350	4
	Fresh Fish Fillets	350	3
	Fresh Breaded Scallops	350	4
	Breaded Fried Clams	350	1
	Breaded Fried Oysters	350	5
	Frozen Fish Sticks	350	4
CHICKEN	Raw to Done	325	12-15‡
	Croquettes	350	3-4‡
	Turnovers	350	5-7‡
	Pre-Cooked, Breaded	350	3-4‡
MISCELLANEOUS	Breaded Veal Cutlets	350	3-4
	Breaded Onion Rings	375	1½-2
	Pre-Cooked Broccoli	350	3
	Pre-Cooked Cauliflower	350	3
	Pre-Cooked Eggplant	360	3-4
	Breaded Tamali Sticks	360	3
	Fritters	375	4-5
	French Toasted Sandwiches	375	1
	Yeast Raised Doughnuts	375	1
	Hand-Cut Cake Doughnuts	375	1½
	Doughnuts	375	2-3
	Glazed Cinnamon Apples	300	3-5
	Corn-on-the Cob	300	3
	Turnovers	375	4-5

* Allow for minor variations from these suggested times and temperatures according to the weight, texture, density and other characteristics of the foods you use.

‡ Depending on size.

Table 1-1. Energy Operating Information

ELECTRIC FRYER

ENERGY OPERATING INFORMATION

Capacity	Nameplate KW	Minutes to Preheat to 350°F	Watt-hours to Preheat	Watts/Hr. To Maintain at 350°F	Watts/Hr. To Maintain at 200°F	Minutes to Recover From 200°F to 350°F
12 lbs.	4.5	4 1/2	338	400	190	2
15 lbs.	5.5-6	4 1/2	450	485	230	2
28 lbs.	12	5	1,000	770	360	2
45 lbs.	18	6	1,800	1,050	495	2-3
50 lbs.*	22	6	2,200	836	390	2-3
60 lbs.	18	8	2,400	1,300	520	3-4

* High Speed Deep Well Fryer

ENERGY CONSERVATION IN MESSHALLS

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR **TILTING SKILLET**



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ENERGY CONSERVATION IN MESSHALLS

MODERN TILT TOWARD A COMPLETE COOKING CENTER

Its versatility is so uncanny that the food service industry has not yet arrived at a standard name for it.

Variously called a Tilting Frying Pan, Tilting Braising Pan, Tilting Skillet and Tilting Griddle Skillet -- it is all these, and more.

You can also stew, sauté, simmer, boil, defrost, grill, roast, and process convenience foods in a single pan that provides a modern tilt toward a complete cooking center. It can even be used to hold foods at ideal serving temperatures.

Of European origin, the Tilting Skillet (as close a name as any) has been refined and developed of the domestic food service industry by several leading equipment manufacturers.

It comes in various pan sizes, but the overall design is generally the same. It's a large, heavy-duty pan that swivels up to 90° on a horizontal axis mounted on trunnions. The enclosed self-locking worm and gear tilt mechanism is operated by a hand wheel on most models (a crank handle on one).

The tilt mechanism and pouring lip make it easy to transfer liquid and semi-liquid food into serving pans and hot food holding equipment.

The swing-up cover is counter-balanced and can be maintained in the raised position.

The control console consists simply of a thermostat dial (ranging from 100° to 400°F or 450°F) and signal lights. The heating elements are embedded in the pan base.

Your Tilting Skillet is easy to operate and maintain, though proper handling is essential to obtain maximum performance. Hence this general guide which should be augmented by detailed reference to the operating instructions issued by the individual manufacturer.

OPERATING GUIDE

Your Tilting Skillet may be a counter model, floor model, wall-mounted, mounted on a modular cabinet base, or mounted on casters to expedite mobility between kitchen and serving area.

If it is new, make sure that the protective grease film applied at the factory is completely cleaned off.

ENERGY CONSERVATION IN MESSHALLS

Do not connect it to a power outlet until you have checked the electrical data on the nameplate. If you operate your skillet on the wrong voltage, malfunction may occur.

Some models are equipped with a power on-off switch, others are activated by the thermostat control. Switch on accordingly.

Models with a power on-off switch have a separate signal light that will glow whenever the power is on. The thermostat signal light glows only while the unit is preheating or cycling.

The temperature range on your skillet is from 100° to 400°F or 450°F. Some models will automatically shutdown by tripping the circuit breaker at temperatures above 450°F. To reactivate, simply operate the reset button (or switch) provided on the control console.

Always turn the power off at the end of each cooking day. This rule applies to all electric equipment.

Preheating

Except for boiling, your Titling Skillet should be preheated at the present recommended temperature for all other cooking processes. Permitting the unit to cycle (thermostat signal light flashing on and off) is advocated for more satisfactory results.

The following temperatures are suggested for key cooking processes:

Simmering.	200°F (maximum)
Sauteeing.	225-275°F
Searing.	300-350°F
Frying	325-375°F
Grilling	350-425°F

Simmering must be held at 200°F or boiling (and evaporation) will occur.

For milk-based products, 200°F maximum is recommended to prevent scorching. Lower temperatures will prevent thickening.

Experience will show that some items should be started at a high temperature and then reduced -- to permit sealing in juices for about 20 percent of the time hand cooking for the remaining 80 percent.

ENERGY CONSERVATION IN MESSHALLS

Two different foods can be prepared at the same time. Just place two pans on the skillet and heat the pans with the food in them. (Removable pan guides are featured on some models. Check manufacturers' instructions.)

The Tilting skillet is a top performer with breakfast foods: sausage, bacon, pancakes, fried or scrambled eggs, french toast -- to name a few. By tilting the pan slightly forward, excess fat is kept away from bacon or sausage.

Best Use of Cover

The skillet cover should be closed for simmering and boiling.

Pork, veal, and lamb chops should be started out with the cover open; by closing the cover after browning, they can be ideally finished. Liver is excellent when cooked with the cover closed.

Pot roasting beef is best done by browning six to eight pound pieces with the cover raised. After well browned, add beef stock and flour seasoning. Then close the cover and continue cooking at reduced heat until done.

Flavorful stews are easily prepared by browning small pieces of meat, then adding beef stock, water, and vegetables for cooking with the cover closed.

Proofing, Holding, and Roasting

Your skillet can be converted into an efficient proofing box-- for breads, rolls, sweet rolls, and cakes. Set the temperature a 100°F and close the cover. (A small pan of water may be added for extra humidity.)

With temperatures set at 150-175°F your skillet can be utilized as a holding unit.

Normal temperature roasting, or even low temperature roasting (150-200°F) can be performed in your skillet. Low temperature roasting, of course, increases serving through reduced shrinkage.

- * Continue cooking for just 20 minutes at 200°F with the cover closed.

- * Serve, tilt skillet, and flush out.

ENERGY CONSERVATION IN MESSHALLS

Compared with your former method, you have saved two transfers, washing of two pots, and about half the total cooking time. Sauces and chicken have maintained their proper temperature. There is little or no loss of moisture in the sauce.

You have used -- and cleaned -- only one piece of equipment.

CLEANING CARE

Because your Tilting Skillet is in use for a wide variety of foods -- for breakfast, lunch, and dinner service -- clean it as soon as possible after each use.

Before starting to clean, make sure that power is off; then follow this recommended procedure:

- * Flush the pan thoroughly with lukewarm water, then drain - to remove as much loose soil as possible.
- * For average soil, use a cleaning solution (one ounce of recommended cleanser to three gallons of hot water) and brush thoroughly all parts, including pouring lip, that touch or are splashed by food, particularly underside of the cover. (Use a fiber bristle brush.)
- * For cooked-on or hardened soil, use a solution of one ounce of cleanser to two gallons of hot water. Soak for at least 30 minutes, making sure that cleaning solution covers the highest food soil rings. Then brush thoroughly as outlined above.
- * Brush and clean all exterior surfaces. Use cleaning solution from the pan. Rinse well.
- * Flush entire unit with clear, tepid water.
- * To prevent development of undesirable odors and off flavors, rinse the pan with a solution of a recommended sanitizing agent, then drain. Spray or fog inner surfaces with clear water to rinse. Keep cover closed until ready to resume cooking.
- * For mineral deposits and film caused by hard water and resistant food residues: Let pan cool until cold to touch, then clean inside and outside with a recommended solution. It may be necessary to soak the deposits well before scrubbing them off with a brush. In hard water areas, this procedure should be carried out weekly.

ENERGY CONSERVATION IN MESSHALLS

IMPORTANT: Never use steel wool, metal sponges, or scouring powders when cleaning your Tilting Skillet. The resulting scratches, no matter how minimal, will shorten the life of the equipment, detract from its appearance, make subsequent cleaning increasingly difficult, and lead to food contamination.

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR **ELECTRIC WAREWASHING** **EQUIPMENT**

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ENERGY CONSERVATION IN MESSHALLS

SUCCESSFUL WAREWASHING SYSTEMS

An efficient warewashing system requires careful dish room procedures, proper cleaning and maintenance schedules, and thorough training of employees. Warewashing can become the source of savings in time and labor.

A total warewashing system is composed of three separate but interdependent tasks. The first of these is clearing the soiled tableware from tables in the dining area and transporting them to the dishwashing area. The second is washing the soiled tableware. The third is sorting and transporting them to the points of reuse. All three of these basic tasks offer numerous opportunities for efficiency and savings. This information will be limited primarily to the operation and care of warewashing equipment, and the environment of the warewashing operation.

CHOOSING WAREWASHING EQUIPMENT

There are many types and models of warewashing machines on the market, machines with certain benefits and operational criteria. To select the machine and other equipment best suited to an operation's particular needs, the following points must be considered:

- * Type of menu, meal volume, and turn-over time.
- * Number of seats and size of dining area.
- * Related location and dimensions of dish room.
- * Bussing methods; i.e., manual, cart, or conveyor.
- * Pieces of tableware used per setting.
- * Duration of meal peaks.
- * Soiled dish storage method and capacity.
- * Location and method of prescraping, waste disposal, and pre-washing facilities.
- * Compliance with pertinent sanitation regulations.
- * Organization and training of dish room labor.

A careful analysis of the above factors should help the food service operator narrow down his choice of a warewashing machine and the auxiliary equipment necessary.

ENERGY CONSERVATION IN MESSHALLS

TYPES OF WAREWASHING MACHINES

There are four general categories of warewashing machines on the market. Within these groups, a wide variety of models, options, and configurations are available.

Single-Tank, Stationary Rack Hood or Door Type: This type of machine consists of a tank for wash water at the temperatures required, which is circulated by means of an electric motor-driven pump through spray pipes or nozzles above and below or below the rack of dishes. It is provided with a cover, hood, or door. The final sanitizing rinse is accomplished with fresh hot (180°F) water from a separate set of spray pipes or nozzles above and below the ware. Hood type machines are installed in counters. Door type are free-standing.

Conveyor-Rack Type: This type of machine is available in one, two, or three tank models. Tableware is loaded onto racks which move on a continuous chain conveyor. The conveyor carries filled racks through automatic washing and rinsing cycles. As soon as space becomes available on the conveyor, the operator places a second rack directly behind the first at the entry end of the machine. As a result, more than one rack of tableware at a time normally passes through the machine. A two-tank machine has a detergent wash, a hot-water rinse, and a final sanitizing rinse. A three-tank machine includes a prewash cycle along with a detergent wash, a hot water rinse, and a final sanitizing rinse. These machines come equipped with prewashed nozzles, eliminating the need to spray rinse flat tableware manually.

Multiple-Tank Rackless-or-Flight-Type: These are essentially the same as conveyor rack machines. The tableware is loaded directly onto the continuous belt conveyor. Flight type dish machines usually require more floor space, since their overall dimensions and capacity are greater than that of conveyor rack machines. They are also available in one, two, or three tank models.

Circular Conveyor Type: These may be called carousel or merry-go-round. The circular floor space conveyor type system employs a conveyor to move dish racks. The flight type provides a rackless belt to convey the ware being washed. The conveyor or belt extends through the dish machine in a continuous loop. The loop is not always circular. Floor space restrictions occasionally make a triangular or square-shaped configuration more appropriate.

WAREWASHING MACHINES

Specifications for temperature, water volumes, times, and pressures

Type of Machine	Wash			Pumped Rinse			Final Rinse @ 20 PSI (Flow Pressure)		
	Vol. Water	Min. Expo- sure	Min. Temp.	Vol. Water	Min. Expo- sure	Min. Temp.	Minimum Water Volume	Min. Expo- sure	Min. Temp.
Single Tank Stationary Rack 16 x 16 inch 18 x 18 inch 20 x 20 inch	60 gal.	40 sec.	150°F	(Not applicable except in multiple-tank machines, which recycle the rinse water. Know your machine before attempting to adjust tank temperature. "Multiple- tank" refers to machines with wash and pumped- rinse cycles—not to systems with mechanical pre-wash or pre-scrape units. The latter do not contribute to sanitization, due to low water temperature.)			1.15 gal.	10 sec.	180°F
	75 gal.	40 sec.	150°F				1.44 gal.	10 sec.	180°F
	92 gal.	40 sec.	150°F				1.73 gal.	10 sec.	180°F
Single Tank Stationary Rack Single Temp.	60 gal.	40 sec.	165°F				14.7 gal.	30 sec.	165°F
	75 gal.	40 sec.	165°F				18.6 gal.	30 sec.	165°F
	92 gal.	40 sec.	165°F				23 gal.	30 sec.	165°F
Single Tank Stationary Rack Chemical Sanitizing	Total 80 gallons includes sanitizing rinse		120°F				Total 80 gallons includes wash vol.		120°F, 50 ppm Cl ₂ or other accepted sanitizing solution
Single Tank* Conveyor 20-inch width	3 gal./ lin. inch conveyor	15 sec.	160°F				6.94 gal. per min.	Max. conv. speed 7"/min.	180°F 6" spread 5" above conveyor
Multiple Tank* Conveyor 20-inch width	1.65 gal./ lin. inch conveyor	7 sec.	150°F	1.65 gal./ lin. inch	7 sec.	160°F	4.62 gal. per min.	15'/min. max. convey. speed	180°F 3" spread 5" above conveyor

* Note: Wash and/or pumped-rinse makeup water may add up to 2 additional gallons/min. to final rinse volume demands.

ENERGY CONSERVATION IN MESSHALLS

WAREWASHING PROBLEMS AND CURES

SYMPTOM	POSSIBLE CAUSE	SUGGESTED CURE
SOILED DISHES	<ul style="list-style-type: none"> • Insufficient detergent. • Wash water temperature too low. • Inadequate wash and rinse times. • Improperly cleaned Equipment. • Racking. 	<p>Use enough detergent in wash water to insure complete soil removal and suspension.</p> <p>Keep water temperature within recommended ranges to dissolve food residues and to facilitate heat accumulation (for sanitization).</p> <p>Allow sufficient time for wash and rinse operations to be effective. (Time should be automatically controlled by timer or by conveyor speed).</p> <p>Unclog rinse and wash nozzles to maintain proper pressure-spray pattern and flow conditions. Overflow must be open. Keep wash water as clean as possible by pre-scraping dishes, etc. Change water in tanks at proper intervals.</p> <p>Check to make sure racking or placement is done according to size and type. Silverware should always be presoaked, placed in silver holders without sorting. Avoid masking or shielding.</p>
FILMS	<ul style="list-style-type: none"> • Water hardness. • Detergent carryover. • Improperly cleaned or rinsed equipment. 	<p>Use an external softening process. Use proper detergent to provide internal conditioning. Check temperature of wash and rinse water. Water maintained above recommended temperature ranges may precipitate film.</p> <p>Maintain adequate pressure and volume of rinse water, or worn wash jets or improper angle of wash spray might cause wash solution to splash over into final rinse spray.</p> <p>Prevent scale buildup in equipment by adopting frequent and adequate cleaning practice. Maintain adequate pressure and volume of water.</p>
GREASY FILMS	<ul style="list-style-type: none"> • Low pH. • Insufficient detergent. • Low water temperature. • Improperly cleaned equipment. 	<p>Maintain adequate alkalinity to saponify greases; check detergent, water temperature. Unclog all wash and rinse nozzles to provide proper spray action. Clogged rinse nozzles may also interfere with wash tank overflow. Change water in tanks at proper intervals.</p>
STREAKING	<ul style="list-style-type: none"> • Alkalinity in the water. • High dissolved solids in water. • Improperly cleaned or rinsed equipment. 	<p>Use an external treatment method to reduce alkalinity. Within reason (up to 300-400 ppm), selection of proper rinse additive will eliminate streaking. Above this range external treatment is required to reduce solids.</p> <p>Maintain adequate pressure and volume of rinse water. Alkaline cleaners used for washing must be thoroughly rinsed from dishes.</p>
SPOTTING	<ul style="list-style-type: none"> • Rinse water hardness. • Rinse water temperature too high or too low. • Inadequate time between rinsing and storage. 	<p>Provide external or internal softening. Use additional rinse additive.</p> <p>Check rinse water temperature. Dishes may be flash drying, or water may be drying on dishes rather than draining off.</p> <p>Allow sufficient time for air drying.</p>
FOAMING	<ul style="list-style-type: none"> • Detergent. • Dissolved or suspended solids in water. • Food soil. 	<p>Change to a low sudsing product. Use an appropriate treatment method to reduce the soil solid content of the water.</p> <p>Adequately remove gross soil before washing. The decomposition of carbohydrates, proteins or fats may cause foaming during the wash cycle. Change water in tanks at proper intervals.</p>
COFFEE, TEA, METAL STAINING	<ul style="list-style-type: none"> • Improper detergent. • Improperly cleaned equipment. 	<p>Food dye or metal stains, particularly where plastic dishware is used, normally requires a chlorinated machine washing detergent for proper destaining.</p> <p>Keep all wash sprays and rinse nozzles open. Keep equipment free from deposits of films or materials which could cause foam build-up in future wash cycles.</p>

ENERGY CONSERVATION IN MESSHALLS

CLEANING AND MAINTENANCE

Preventive maintenance and regular cleaning are essential to the continued satisfactory operation of warewashing machines, as well as to meet rigid sanitation standards. A cleaning and maintenance schedule should be worked out and posted near the warewashing machine for easy visibility. Ideally, responsibility for cleaning and maintenance tasks should be delegated to one person whenever possible, to reduce duplication of effort and resulting in better management and follow-through.

Here are some important cleaning and maintenance tips:

- * Equipment should be set out away from walls so easy access may be had to all parts of it to allow both cleaning and mechanical maintenance.
- * The warewashing machine should be flushed after each heavy serving period, and cleaned thoroughly at the end of each day's operation.
- * All removable components inside the machine should be removed daily and cleaned thoroughly. Food soils will build up rapidly upon the curtains and cause rapid deterioration of them. In situations where machines are used almost 24 hours each day, it is recommended that two sets of curtains be provided and that these be used on alternate days, one set being permitted to dry out completely while the other is being used.
- * Scrap trays should be emptied frequently or they will interfere with the proper recirculation of the water. If trays are not in good repair and permit large food scraps to enter the wash tank, the food scraps will be recirculated with the wash and rinse water, clog the jets in the wash and rinse arms, and interfere seriously with the proper washing action.
- * Overflow pipes from the various tanks should be kept clean and free of debris. A proper and continuous overflow from the wash and power rinse tanks is essential to provide for the carry-off of excess detergent in the power rinse tank and to prevent the accumulation of food, soil, and debris in the wash tank. A clogged overflow will permit the water level to rise to a point which will interfere with the proper action of the bottom wash arms or jets. Excessive food soils and grease in the wash tank will also require the use of additional quantities of detergent.

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- * Wash and rinse jets should be kept clean and free of deposits and debris. Food scraps and bits of debris such as lettuce, paper, matches, and similar material can, through faulty pre-washing operations and inadequate scrap trays, be carried into the wash water. When this happens, the material is recirculated in the circulating wash water, clogs the wash jets, and an inadequate washing job will result. The wash and rinse jets should be examined and cleaned thoroughly after each period of peak use and, in the case of continuous operation of the machine, should be checked at least once each hour during heavy operation. Routine inspection of the final rinse jets or nozzles should be done to ensure that they are not materially reduced in size due to mineral build-up.
- * Mineral deposits from the water supply will interfere with the machine's effectiveness. Heavy liming will clog wash and rinse jets, and will seriously reduce the quantity of water being delivered to the machine. Even where minimum hardness does not indicate the need for softening of the water supply, liming will often be experienced due to the high water temperatures used in warewashing machines.

These lime deposits create rough surfaces within the machine which provide breeding places for bacteria, and make cleaning difficult. In addition, the lime deposits can alter the shape of the water and rinse spray jets and drastically change the washing efficiency of the machine. Inorganic acids, such as muriatic acid, should not be used for cleaning or deliming. Safe acid cleaners are available, which can be circulated in the machine to remove these lime deposits. This procedure should be followed as often as necessary to keep the machine free of deposits.

- * The automatic detergent dispenser should be checked regularly and adjusted when necessary to keep it clean and functioning properly.
- * Rinse injector equipment should be maintained properly and cleaned regularly for the most efficient performance.
- * Equipment lubrication should be followed according to manufacturer's instructions.

TEMPERATURE AND PRESSURE CONTROL

Temperature control of the water used in the warewashing operation is of utmost importance for cleaning and proper sanitization.

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The data plate on the warewashing machine should specify:

- * Required wash water temperature in the tank.
- * Required pumped rinse water temperature in the tank, if applicable.
- * Required final rinse water temperature.
- * Maximum conveyor speed.
- * Chemical type concentration of sanitizer to be used, if applicable.
- * Optimum final rinse pressure.

Individual thermometers should be on the machine to show the temperature of water in all tanks, as well as the temperature of the final rinse water. An automatic thermostatic control will control the temperature in the wash and pumped rinse tanks. Thermometers should be checked occasionally for accuracy of 3°F at the required temperatures.

A final sanitizing rinse temperature of 180°F is required in warewashing operations. Most operations use a booster water heater to supply the 180°F water. When the booster water heater is located farther than 5 feet from the point of use of the water at the machine, mechanical recirculation of the hot water to the machine must be provided. The 180°F hot water supply lines should be kept as short as possible (to reduce heat loss), insulated, and should not be used as a supply line for any other purpose. The recirculation pump must be in operation at all times that the warewashing machine is in operation to ensure an adequate supply of fresh rinse water at the proper temperature.

Temperature of the wash water is also extremely significant in providing effective sanitizing of the tableware. Wash temperatures less than those prescribed will result in ineffective sanitization of the dishes, even when the final rinse temperature is properly maintained. This is due to the cumulative temperature effects of the wash, power rinse (if applicable), and the final rinse water to make certain that the dish reaches a temperature high enough to ensure proper sanitization (161°F), the wash temperature in a single tank conveyor machine must be a minimum of 160°F. In stationary rack machines having longer washing cycles or in multiple tank conveyor machines, wash temperatures may be permitted at 150°F.

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Although water temperatures must be kept high enough for sanitization, it is also important that the temperature of the rinse water in the fresh water rinse line not be allowed to exceed 195°F. Water at this temperature and above tends to steam and vaporize when released from pressure in the lines, thus dissipating the heat before it reaches the surface of the utensils. This also wastes energy, and releases more heat to the room than is necessary.

The water pressure should be between 15 psi and 25 psi on the fresh water rinse line at the machine. If the pressure falls, the volume of water delivered per unit of time is reduced. An excessive pressure will result in excessive water used and, as a rule, unsatisfactory temperature control. Pressures should be checked periodically with a properly calibrated gauge and the necessary adaptive fitting.

THE DISH ROOM ENVIRONMENT

The proper planning and construction of the dish room is important to employee morale, as well as to the overall operation of a successful warewashing system.

The constant operation of the warewashing machine introduces a great deal of steam vapor and heat into the dish room. It is necessary that this steam be removed, preferably by mechanical exhaust ventilation directly above the machine; however, general room ventilation may be used. In any case, the system must be adequate to eliminate steam and vapors. Excessive ventilation, however, is likewise detrimental in that wash power-rinse and final-rinse temperatures may be negatively affected.

Mechanical ventilation will also tend to reduce the relative humidity in the room thus enhancing the air-drying of tableware while making the room comfortable for employees.

Warewashing machine operators should be properly trained in the cleaning and sanitizing of tableware and the health hazard of improperly washed dishes.

ENERGY MANAGEMENT TIPS

- * Proper ventilation will eliminate most of the steam and vapors, and reduce the heat in the area, easing the load on the air-conditioning system.
- * Check the valves on water lines to the machine to make sure they are not leaking.

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- * Leaking valves represent constant water consumption, and a waste of energy when they are hot water lines.
- * All hot water lines in a recirculation loop should be insulated.

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR **MICROWAVE OVEN**

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ENERGY CONSERVATION IN MESSHALLS

FASTEST WAY TO HEAT IN THE LEAST SPACE

Microwaves are short radio waves of the same kind used in radar and television. The frequency most commonly used in microwave ovens is 2,450 megacycles. The radio energy penetrates the food and is converted into heat.

Microwave ovens provide the fastest possible way to defrost, heat, or cook with the least amount of power in the smallest amount of space. Primary cooking, however, is limited to some seafoods and vegetables (see chart).

Since food can be defrosted and heated by microwaves in seconds, you can offer more customers a greater menu variety. Foods can be precooked, refrigerated until needed at peak serving times, then heated almost instantly. Preportioned foods can be reconstituted as needed for late arrivals. Hard-to-prepare specials or slow moving items can be precooked, frozen, and reconstituted to order -- avoiding waste and leftovers. Consequently, food preparation can be done during slack periods and the work load distributed more efficiently.

WHEN YOUR OVEN IS NEW

Unpack your new microwave oven very carefully and examine for shipping damage.

Packed with the oven are the instruction manuals. Study these thoroughly, then file safely for future reference.

Make sure that the voltage and current characteristics match your electrical service.

Have your oven installed and connected by your maintenance or public works department.

Units should be sited on counters behind the short order line.

Do not place microwave units near cooking devices that give off excessive steam or heat. The working area temperature should not exceed 90°F.

Allow for air circulation behind the oven in accordance with manufacturers' recommendations. Neither the airflow filter nor the discharge outlet should be obstructed.

To attain maximum performance, no other power consuming devices should be added to the same circuit.

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CORRECT OPERATING SEQUENCE

1. Turn on switch. On most models a signal light will indicate unit is working. Wait from 10 to 90 seconds (according to make and model).
2. Oven is now ready for continuous operation. Load food on its own serving dish. For maximum performance, place only one kind of food item in the oven at one time. Close door securely.
3. Set timer dial or push starter control if so equipped. Present push button timers are adjustable to suit menu pattern. (See manufacturers' instructions.)
4. Activate starter control. A cooking signal light will come on.
5. At completion of timed cooking cycle, cooking signal light will go off.

CAUTION *Use cooking containers made only of paper, glass, porcelain, plastic, or ceramic. Never use metal utensils. Refer to manufacturers' handbook regarding use of all types of foil wrap.

- * Never activate starter control when oven is empty with door closed. However, oven may be kept on "stand-by" between loads (switch on, door closed).
- * If door is opened during cooking cycle, the unit automatically shuts off.
- * Timers on some models must be reset to continue cooking cycle.
- * Microwaves are ideal for defrosting -- or "finishing" -- meats but not for cooking from raw to done. Conventional cooking equipment should be used for browning.

CLEANING CARE

Microwave ovens are inherently clean -- no fumes or grease encrusted pans to deal with, cleaning is simple:

- * Turn switch off.
- * Wipe all exposed surfaces in the oven cavity with a cloth or sponge, using a recognized and acceptable detergent solution containing bacteria retardant. Dry off.

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- * Check and remove any interior traces of spillage by same process.
- * Wash the surface on the door interior with the same detergent solution. Dry.
- * Do not use scouring pads, powders, or other abrasive materials on any of the oven surfaces.
- * Turn switch on and resume normal operations.

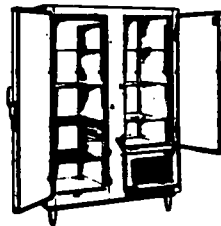
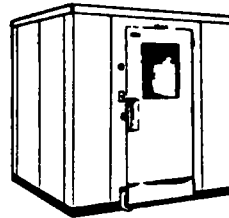
ENERGY CONSERVATION IN MESSHALLS

REPRESENTATIVE TIME CHART FOR MICROWAVE OVENS*

ITEM	SPECIAL INSTRUCTIONS	TIME
HEATING		
Casseroles Beef Stew (8 oz.) Chicken a la King (8 oz.) Chicken Noodle Soup (8 oz.) Macaroni and Cheese (8 oz.) Spaghetti with Meat Balls (8 oz.)	Cover, depress center. Heat in non-metallic dish. Cover, depress center. Heat in non-metallic dish. Cover, depress center. Heat in non-metallic dish. Cover, depress center. Heat in non-metallic dish. Cover, depress center. Heat in non-metallic dish.	70 secs. (from 40°F.) 70 secs. (from 40°F.) 70 secs. (from 40°F.) 70 secs. (from 40°F.) 70 secs. (from 40°F.)
Rolls, Pastries, Breads and Pancakes Dinner Roll (one) Small loaf Apple pie (one 4 oz. piece) Pancakes (6 oz. portion)	Heat uncovered on non-metallic dish. Heat uncovered on non-metallic dish. Heat uncovered on non-metallic dish. Use waffle batter mix and pre-cook on griddle. Cool on rack. Refrigerate. Heat when ordered.	4 secs. (from room temp.) 8 secs. (from room temp.) 15 secs. (from room temp.) 45 secs. (from 40°F.)
Sandwiches—fully cooked fillings Hot Dog (raw) Ham and Cheese Hot Corned Beef (3 oz. portion)	Assemble, keeping hot dog towards top of bun. Assemble with cheese on top. Hold in refrigerator. Slice, portion, assemble, and hold refrigerated.	20 secs. (from 40°F.) 20 secs. (from 40°F.) 18 secs. (from 40°F.)
Meats Sliced Roast Beef (6 oz. portion) Barbecued Spareribs (8 oz. portion) Fried Chicken Breast (6 oz.)	Roast conventionally; cool; slice chilled. Heat to order in microwave. Pre-cook spareribs; refrigerate. Heat to order in microwave. Fry chicken in fat fryer; drain. Hold at room temperature. Heat in microwave.	25 secs. (from 40°F.) 60 secs. (from 40°F.) 35 secs. (from 40°F.)
Vegetables Baked Potato (average 8 oz.) Green Beans (4 oz. portion) Peas (4 oz. portion)	Pre-bake to about 80% doneness, allow to cool, and hold at room temperature. Heat individually as order is received. Cook in conventional manner. Butter, pre-portion, and hold refrigerated. Cook in conventional manner. Butter, pre-portion, and hold refrigerated.	45 secs. (from 40°F.) 25 secs. (from 40°F.) 25 secs. (from 40°F.)
DEFROSTING		
Strip Steak (12 oz.) Lobster Tails (2 5-oz. tails) Trout (12 oz.) Frozen, baked stuffed potato	Cover with waxed paper, defrost in microwave by applying 25 seconds of time to both sides. Finish off to desired doneness on conventional broiler. Reheating may be done after in microwave. Cover with waxed paper, defrost, and cook either in microwave or under broiler. Cover with waxed paper, defrost, and cook either in microwave or under broiler. Depress center before freezing. Cover with waxed paper; defrost. Heat to serving temperature either in microwave or brown under broiler.	50 secs. (from 40°F.) 45 secs. (from 40°F.) 50 secs. (from 40°F.) 45 secs. (from 40°F.)
PRIMARY COOKING		
Bacon Rainbow Trout (10 oz.) Lobster tails (1 5-oz.)	Heat covered with absorbent paper—per ½ oz. slice. Stuff, if desired. Brush with butter, heat with a loose waxed paper overwrap. Turn over after one-half the cooking time. Prepare as for broiling, season with salt and paprika and cover with loosely wrapped waxed paper. Heat until lobster meat is no longer translucent.	25 secs. (from 40°F.) 60 secs. (from 40°F.) 1 min. 20 secs. (from 40°F.)

*Times are approximate and are based on specifications of one microwave oven model that requires a power source of 120-205/250 volts, single phase, four wire service at 30 amperes. Since times may vary according to oven make and model, as well as local voltage supply, it is advisable to check the recommended time charts furnished by manufacturers in their oven manuals.

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR **ELECTRIC REFRIGERATION** **EQUIPMENT**



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AN INTRODUCTION TO REFRIGERATION

The development of efficient refrigeration systems in food service operations has made possible the preservation of perishable foods, reduced a great deal of waste, and promoted the attractive, appetizing appearance of fresh, cooked, and frozen foods at the time of service.

The importance of keeping all refrigeration units running at top performance levels cannot be overstated. Proper use, logical planning and regular cleaning and maintenance of refrigeration equipment offer the food service operator efficiency, increased productivity, and a trouble-free service life. Refrigeration means, simply, the removal of heat -- not "making cold." This heat removal is effected by proper air circulation, both inside and outside the refrigerator cabinet.

This may be either natural or forced by use of a fan and duct system large enough to permit even distribution of air from top to bottom, and to affect self-defrosting.

The refrigeration circuit has three main component parts. The evaporator, located inside the cabinet, carries cold liquid refrigerant through a set of coils which absorbs heat from the cabinet, turning the refrigerant into a gas. The compressor, located on the exterior of the cabinet, compresses the gas until it becomes very hot and occupies a small area. The condenser, also located outside the cabinet, carries the hot refrigerant gas, through coils, where an adjacent fan cools it until it again becomes a liquid. As the liquid refrigerant passes through an expansion valve back to the evaporator, it again becomes very cold, and the cycle continues.

CHOOSING REFRIGERATION EQUIPMENT

Before you invest in refrigeration equipment, a great deal of planning must be done. consulting with designers, manufacturers, and utility representatives is a must along with evaluation of the following factors:

- * Size and type of food service operation.
- * Type of menu and service.
- * Seating capacity.
- * The arrangement of the back of the house area.

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- * The form in which food is purchased.
- * Delivery patterns for frozen and perishable foods.
- * Volume of frozen and perishable foods used.

The central selection factor for refrigeration equipment lies in the careful preplanning of a total system. This system may include walk-in, bulk storage, freezers, and refrigeration equipment and several reach-ins placed throughout the kitchen in main preparation areas to save time and steps for all personnel in the kitchen.

The refrigeration equipment that is finally selected should ensure reliable and efficient operation, and should be flexible enough to serve the changing needs of the operation. It should be positioned in the operation to fit a logical traffic flow, and designed to do a specific job with maximum efficiency.

Flexibility is accomplished through the many optional components available with today's refrigeration equipment. For example, portable shelf sections in walk-ins, roll-in and slide-in shelf sections for reach-ins, pass-through sections with glides for trays or even with floor doors to accommodate mobile carts.

Good insulation is of prime importance for proper refrigeration. The most common types of insulation are fiber-glass and polyurethane form. The floors of roll-in, and slide-in refrigerators and storage freezers must also be insulated.

CLEANING AND MAINTENANCE

The operational efficiency of a refrigeration system depends in large part on the cleaning and maintenance care it receives. Besides lengthening the service life of the equipment and keeping it at top performance, a regular cleaning and maintenance schedule conserves energy.

- * All mechanical parts of the refrigeration unit should receive routine care and cleaning.
- * The condensing unit should be shut off and cleaned, particularly the condenser, which should be brushed. Clean off all dust and grease at intervals from 1 week to 3 months. The frequency of the cleaning will depend in part, on the placement of the refrigeration: the closer it is to cooking areas, the more frequently it must be cleaned.

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- * The evaporator should also be cleaned, or defrosted, on a regular schedule. Many models, including most "low temperature" units (or frozen food cabinets) are equipped with an automatic defrost cycle. Although these should require little attention, they should be checked periodically at least once a month to see that the defrost mechanism is in good working condition.
- * Manual defrost equipment must be taken care of on a regular schedule that will depend on use and climates. Ice on the cooling coils will greatly lessen the efficiency of the cooling system, making a regular defrosting schedule of utmost importance. During the defrosting procedure, turn the equipment off and remove all food. Wrapping food items will act as insulation and prevent the transfer of cold from the products to the air. Remove soft frost and ice from the coils with a plastic or wooden scraper -- do not use an icepick or screwdriver! Remove the hard ice by melting. This process may be speeded up by placing an electric fan in front of the open cabinet, or simply by placing pots of boiling water inside the cabinet. If the coil is heavily iced, be sure that all of the ice is removed from the entire coil before you turn the equipment back on. The "face" of the coil may be clean, while the back or bottom is still blocked with ice.
- * The latch and hinges of the refrigeration cabinet should be lubricated about once a month for best performance.
- * Door gaskets should be checked and adjusted if necessary to see that doors are sealing properly. One easy test that has been suggested is that the gasket should resist the pull of a dollar bill placed between the gasket and the cabinet body. Gaskets should be cleaned regularly, as well, to ensure resiliency and a tight seal.
- * The cabinet interior should be thoroughly cleaned at least once a week. Spills should be wiped up immediately. A good cleaning involves the removal of all shelving and trays, and thorough washing with a baking soda type of solution.

ENERGY MANAGEMENT TIPS

Keeping your refrigeration equipment running at top performance through regular cleaning and maintenance will help save energy. Here are other operating tips to promote good energy management.

- * Don't open the door to a refrigerator any more than is absolutely necessary. Every time the door is opened, a great

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amount of kitchen heat enters the cabinet which must be absorbed as soon as the door is closed. Any unnecessary opening of doors puts an extra load on the refrigeration circuit.

- * Allow hot foods to cool before placing in refrigerator.
- * The more food items you can remove from the refrigerator or freezer in one opening of the door, the less time the door needs to be open. The use of mobile racks and pan and/or tray slides are energy-conserving as well as convenient. With a roll-in refrigerator, the entire cart should be entered or removed from the unit at a time, rather than opening and closing the door continually for the removal or placement of only a few food items at a time.
- * Doors equipped with magnetic closings and self-closing hinges will assure that the door closes quickly and properly every time that it is meant to.
- * Sliding glass doors are excellent for visibility; however, because sliding doors need "slide clearance," they don't make a good, tight refrigeration seal. For the most efficient operation, the sliding door cabinet should be located in an air-conditioned room -- definitely not in a hot kitchen.
- * Pass through cabinets should never be equipped with sliding doors on both sides unless they are situated in an air-conditioned area. This type of refrigerator can suffer extreme temperature problems because of frequent door openings, often on both sides at the same time. However, pass through models with sliding doors on the serving side and hinged doors on the kitchen side are practical and regularly used.
- * There is more "cold air loss" (actually, full heat exposure) when full-height doors are open, exposing the entire cabinet cavity. Use half-height doors whenever feasible, and especially when the refrigerator is placed across from, or adjacent to, cooking equipment.
- * For good air circulation within the cabinet, products should be stored loosely, to permit a good flow of air around individual items. Keeping the interior of your cabinet in order can prevent long door openings. Place the more frequently needed items at the front, within easy reach. Clear labeling of stored products will mean less confusion, time saved, and a shorter door opening, as well.

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- * Proper wrapping of the food products in frozen food storage cabinets is important to preserve nutritional values, taste, and texture. Besides the prevention of dehydration and oxidation, the proper wrapping of food can also prevent excess frost formation on the side of the freezer and evaporator coils.

PRINCIPLES OF ENERGY MANAGEMENT - REFRIGERATION EQUIPMENT

Refrigerators and freezers work more hours than any other equipment in the galley.

Good energy management requires applying the following principles.

1. Make sure that door gaskets are cleaned and fit snugly.
2. Place refrigerated and frozen foods into refrigerator or freezer immediately upon receipt.
3. Do not place hot foods in refrigerator or freezer.
4. Do not open doors frequently or hold them open for long periods of time.
5. Keep evaporator coils or walls free of excessive frost.
6. Keep condenser coils free of dust, lint, or obstructions that tend to reduce air circulation.
7. Make sure equipment is not located in a hot environment.
8. Maintain equipment in good repair.

APPLYING ENERGY MANAGEMENT PRINCIPLES

Make Sure Door Gaskets Are Clean And Fit Snugly

We have seen the dollar bill test demonstrated for testing a refrigerator or freezer door gasket. In this test the bill is placed on the refrigerator mullion and the door is closed on it. If the bill is held securely in place by the door gasket, it is considered to fit snugly enough. The test should be made for the entire length of the gasket. If it is not held securely, the door should be adjusted and/or the gasket replaced. In the absence of a bill, a 3 X 5 card or other piece of paper may be used. Visual inspection will also sometimes reveal a worn or deteriorated door gasket. Gaskets should be maintained properly and kept clean and free of food particles.

ENERGY CONSERVATION IN MESSHALLS

Place Refrigerated and Frozen Foods Into Refrigerator or Freezer Immediately Upon Receipt

If frozen and refrigerated foods are allowed to remain on the loading dock or in the receiving area, they will absorb heat and then require more energy to cool to the desired or safe holding temperature.

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR **STEAM COOKERS**



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ENERGY CONSERVATION IN MESSHALLS

NEW KITCHEN FOOD PREPARATION SOPHISTICATION WITH STEAM COOKERS

The modern steamer is perfectly adaptable to prime cooking, reheating, or reconstituting.

Vegetables are a steam cooker specialty, but meats, poultry, spaghetti, and many other foods can be prepared with high efficiency and minimal labor input.

Frozen prepared convenience foods can be speedily readied for serving in a steam cooker without removing them from their original containers.

Steam cooking produces top quality results, preserves all nutrient values, flavors, and natural food colors.

Because of the amazing speed of steam cooking, small batches can be processed toward the end of meal periods, averting menu "run-outs" and leftover losses through overestimating head-count.

Cooks are relieved of the burdensome task of lifting heavy stockpots on and off range tops, not to mention pot washing during clean up.

Steam doesn't burn food on pans so pans don't have to be scoured before washing. Steam cookers accommodate various combinations of standard 12-in by 20-in pans (wire baskets, too).

Your steam cooker, though easy to operate, calls for reasonable use and care to deliver maximum performance. This manual is offered as a general guide to proper handling.

However, because of the number of makes and models in use, you are strongly recommended to acquaint yourself with the instructions issued by the individual manufacturer.

BASIC TYPES OF STEAM COOKERS

Three basic types of steam cookers are now in use: high-compression, compartment, and atmospheric.

High-compression steam cookers develop steam pressure of 12 to 15 lbs per square inch. They are ideal for preparing smaller quantities of food at top speed. Rapid defrosting, in some models accomplished by direct jets of steam, is an important performance feature of this type of device.

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With compartment steam cookers (featuring one, two, or three compartments), performance is speedy. Production capacity is equal to the heaviest peaks. These models develop about 5 to 8 lb of pressure per square inch while handling the cooking job on food held in the same standard-sized pans from which it may be served.

Some compartment models are designed in combination with steam jacketed kettles (to be covered in a separate manual).

Atmospheric steam cookers do not produce steam under pressure. These models are not as sophisticated or speedy as the pressurized types, but provide versatility in processing everything from frozen foods to frozen prepared items that need only reheating.

The following information is limited to pressure-type steamers.

OPERATING GUIDE HIGH-COMPRESSION STEAM COOKERS

Turn power switch to on, and allow the steamer to preheat for about 10 minutes. A signal light, where provided will glow during preheating, and turn off when the chamber is at the correct cooking temperature.

Load pans directly from freezer, if desired. The steamer will defrost the food when activated. Perforated pans are recommended for root vegetables and sausage products (see manufacturer's handbook).

Secure the door. Where door latch handles are provided, make sure they are turned to the locked position. Where wheel handles are provided, close only tightly enough to stop steam from escaping. (Inspect door gaskets regularly. Worn or damaged gaskets should be replaced immediately to prevent steam escape. It's wise to keep a spare on hand.)

Set the timer to the required cooking time.

Pressure will now build, as indicated by the pressure gauge, to 12-15 psi specified by the manufacturer. Reading should not drop below 8 psi. (Some units have a separate compartment gauge.) Reading will stay under 3 psi during a defrost cycle.

When cooking cycle is completed, the streamer will shut off and exhaust the steam automatically.

ENERGY CONSERVATION IN MESSHALLS

DO NOT ATTEMPT TO OPEN THE DOOR UNTIL THE PRESSURE GAUGE REGISTERS 0.

Where a safety thermostat is provided (it operates automatically if circuits malfunction or cooking chamber overheats, by de-energizing the circuits), you can reactivate the steamer by pressing the reset button on control panel.

A safety valve operates to limit chamber pressure. The safety valve is equipped with a lever for daily manual testing (deposits can cause sticking).

Where a simmering control switch is provided, use it with the timer in the "Off" position and the door shut.

COMPARTMENT STEAM COOKERS

Turn power switch on.

Load pans into compartments and close doors. Turn door handle (or wheel) until latch mechanism is secured. Do not overtighten as door or gasket damage may occur.

Each compartment features its own independent controls.

The timer, on some models, does not start to time until compartment temperature has reached 200°F (indicated by a signal light), so it may be set as soon as door is closed. On other models, time should not be set until pressure gauge registers 4 psi. Both methods accomplish the preheating cycle.

Steam pressure should register 5 to 8 psi during the cooking cycle.

On automatic models, pressure is activated by the timer. On manual models, pull the steam control valve toward you and push down. A normal pressure drop will register when steam first enters the compartment.

Steam pressure should register 5 to 8 psi during cooking cycle.

On automatics, the door interlock will automatically release at the end of cooking cycle, exhausting steam from the compartment, and a buzzer will sound. The buzzer can be silenced by a release button.

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On manual models, when the buzzer sounds, lift the steam control handle to release steam and drain condensation from the compartment. Wait a minute or two before opening the door.

DO NOT OPEN THE DOOR BEFORE THE BUZZER SOUNDS OR THE PRESSURE GAUGE REGISTERS 0.

After opening the door, allow remaining vapors to escape before removing cooked foods.

Always turn the power switch off at the end of each cooking day. This rule applies to all cooking equipment.

CLEANING CARE

Regular cleaning care will enhance the operation and appearance of your steam cooker.

Before cleaning, always check that the power switch is turned off.

Clean all exterior surfaces daily with water and a mild solution of noncaustic compound. Rinse, dry and polish with a soft cloth.

Remove shelves and shelf supports and wash thoroughly with warm water and a mild detergent. Rinse well.

Wash cooking chamber with warm water and mild detergent. Rinse well. Do not use any abrasive cleaners in the cooking chamber (Particles may jam drain valve). A fiber bristle brush will remove stubborn food particles.

Remove all traces of sediment and any mineral deposits from water supply and from drain orifice. This is important after cooking greasy foods and heavy lobster loads.

Manufacturers recommend putting the steamer through 5-minute cooking cycle to flush the drain line.

The doors on high-compression steamers, and the inner doors on compartment cookers, are removable for cleaning.

Be sure to keep both the gasket and metal surfaces against which it seals clean and free of dirt and grease to prolong gasket life.

ENERGY CONSERVATION IN MESSHALLS

To replace a worn or damaged gasket, simply remove retaining plate (or spring assembly) which holds it in place on inner door.

Remember, it's important to manually operate the pressure relief valve daily to make sure it is functioning properly.

For exact operating and cleaning procedures and recommended cooking times refer to manufacturer's handbook for your steamer.

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR STEAM-JACKETED KETTLES

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ENERGY CONSERVATION IN MESSHALLS

ELECTRIC STEAM-JACKETED KETTLES RUN THE GAMUT OF MEAL PRODUCTION

Modern electric steam-jacketed kettles are engineered to deliver steam-jacketing cooking where desired.

Needing only connection to an electrical outlet, most models generate steam by heating a self-contained water supply housed in a cavity between the kettle's outer jacket and inner wall. Consequently, no plumbing connections are needed.

Immersion heaters electrically heat the water to a boil and the steam is then circulated under pressure in the cavity area, heating the inner kettle wall and cooking the food at low temperatures.

This highly efficient method of even heat distribution is recognized as the finest means of preparing food with maximum retention of flavor, nutritional values and appearance.

These versatile performers can roast and braise meats, low temperature cooks a host of foods from soups to desserts and speedily fill on demand small orders.

Wide range of kettle sizes and ease of installation or relocation permits them to be smoothly integrated with other preparation equipment. They can be lined in battery, and interspersed as needed.

Features such as dial temperature controls with built-in thermostat maintain a precisely uniform temperature, assuring optimum quality control.

And there are no possible steam hazards, thanks to built-in safety devices that provide overlapping protection automatically.

Floor model kettles have one-piece, swing-up dome covers, counter-balanced to be held upright when open. Convenient draw-off spouts on these models permit speedy removal of liquids.

Triple basket inserts with rotating rack are available for deep-type jacketed kettles to facilitate preparation of different foods at the same time.

Tilting kettles have an upright handle (or crank handle) for firm control and pouring for rapid, safe food unloading without

ENERGY CONSERVATION IN MESSHALLS

risk of spillage. Some tilting kettles have push button electric powered tilting. The mechanism is self-locking, with smooth starting and stopping.

The information offered herein is generally applicable to all types of electric steam-jacketed kettles. However, operators are urged to familiarize themselves with the detailed instructions issued by individual manufacturers.

TYPES OF STEAM-JACKETED KETTLES

Five types of electric steam-jacketed kettles are now in use: tabletop, shallow, low, tall, and modular; and sized for every need.

Tabletop units, usually tilting types, are designed for virtually any type of small batch cookery to quickly service small batch quantities with peak flavor and minimal waste. They can be spotted on counter tops, stands, or wheeled dollies for maximum flexibility. Temperature ranges are 150-270°F.

Shallow kettles, low in height and of relatively large diameter, are prime meat and poultry roasting and braising units. The shallow draft permits the greatest possible contact of product with the heated surface and prevents crushing of foods. Low kettles are of smaller diameter than shallow units. Deep or tall kettles are of even smaller diameter, occupying less floor space.

Low kettles and deep kettles are used to prepare bulk quantities of such menu items as rice, spaghetti, noodles, macaroni, puddings, soups, stews, etc.

Modular units usually feature a low kettle in a stainless steel cabinet. All electrical components and counterbalanced cover mechanisms are encased.

This design permits installing the unit flush to wall or corner, or having other appliances directly to the sides and/or back of the cabinet without need for extra clearance for connections or cover.

OPERATING GUIDE

Before connecting to the outlet, check the kettle nameplate to be sure you are using the correct electrical power. Using the wrong voltage may cause malfunction.

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READ MANUFACTURER'S INSTRUCTIONS BEFORE OPERATING THE KETTLE

The control system on your steam-jacketed kettle usually includes the following features: an "On-Off" switch, a thermostat control, a signal light (to show when the thermostat is calling for heat), a low water cut-off switch, a pressure relief valve, a pressure limit switch, a thermostatic air vent, a vacuum breaking check valve, a gauge glass, a pressure gauge, and a fill assembly for adding water to the steam jacket.

Before energizing the kettle, always check the water level in the water gauge. This indicates if the heater elements are immersed in the steam jacket's water. Do not operate the kettle when water has dropped below the minimum level specified in the manufacturer's instructions. When adding water, follow directions for correct procedure and type of water to be used.

- NOTES:
1. Never use steel wool, metal sponges or "scouring" powders. They scratch the equipment surface, which makes the cleaning job increasingly difficult and shortens the life and ruins the appearance. In addition, these minute scratches provide an ideal home for bacteria to collect and develop rapidly, causing contamination of food.
 2. Draining of water in jacket, flushing of jacket, and filling jacket with fresh water are not desirable and should be done only when there is evidence of scale or sludge inside jacket. However, jacket should be drained if kettle is to be left for long period in unheated area during cold weather to prevent possible freezing of jacket water.

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR **ELECTRIC TOASTERS**

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ENERGY CONSERVATION IN MESSHALLS

YOU CAN'T AFFORD A TOASTER SHUTDOWN

It is likely that no piece of food service equipment takes more punishment than a toaster. Modern electric toasters have been built to take it, but even they have limits.

Because no operation can afford a toaster shutdown, top quality performance is crucial to the overall service pattern. Research among the leading manufacturers of electric toasters has resulted in the counsel offered in this manual. Careful observance of the tips that follow will help to boost your rush hour operation.

Electric toasters come in two main types: the "pop-up" and the conveyor.

Different models are designed to toast either bread, buns, muffins, and bagels.

With the "pop-up" type, the width of the slots determines the products it will accept. Some of the latest conveyors will handle bread and buns simultaneously or individually, as the need arises.

There are, of course, some design and mechanical variations, according to make and model. Consequently, it is very important for the individual operator and his service staff to follow out the specific instructions issued by the manufacturer for correct use and care. As so many operations feature both "pop-up" and conveyor toasters, the following general information is keyed to both types.

POINTERS ON BREAD, BUNS, AND ROLLS

For best results, bread to be toasted should be "day-old." This applies also to buns, muffins and bagels.

- * Use bread of consistent size and moisture content. Bread which is uneven in moisture or texture will not toast evenly, becoming lighter or darker in spots.
- * Slices of bread for toasting should be stacked evenly with the top and bottom crusts left in place. (If cloth is used to cover the bread it can be dampened slightly but must not be wet.) Do not cut off the edge crusts before toasting. The exposed edges will dry quickly and burn before the rest of the slice is properly browned.

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- * Buns and bagels should be sliced and muffins split.
- * Changing kinds of breads or buns, muffins, and bagels usually requires a change in the setting of the color control dials.
- * Allow refrigerated bread to come to room temperature before toasting.
- * If you serve toast on warm plates you'll prevent moisture condensation on the underside of the bread.
- * Some manufacturers warn against using their toasters for sweet rolls, cinnamon toast, or similar sugary products. Carbonized sugars may affect the toaster operation.

OPERATING GUIDE FOR YOUR POP-UP TOASTERS

Be sure that the nameplate rating and voltage supply are identical before connecting your toaster. Line voltage which is higher or lower than the nameplate rating will affect the production and color of the toast. Check the manufacturer's operating instructions for the approved method for attaining top performance from your toaster.

Before operating, set the color control dial, which ranges from light to dark. A few trial runs will familiarize you with toast colors produced at different settings, giving you results that please your customer.

At a given setting, your toaster will produce slice after slice, within acceptable limits, of uniformly colored toast.

Specialized toasters for English muffins, regular muffins, or bagels are equipped with similar color controls dials. Dial settings depend on the product, its moisture, and color desired. In toasting these split products, drop the halves into the slots with the cut surfaces facing each other.

With the color dial set, and the product loaded, all you have to do is depress the carriage lever. The rest is automatic. The product will pop-up at the end of the toasting cycle, color-controlled by the timer.

NOTE: Each lever and color dial controls two slots.

If necessary to interrupt the toasting cycle, press the manual trip release knob located near the color control dial. On some models, cycle interrupt is accomplished by lightly pushing up the carriage lever.

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If the toast does not pop-up freely when the cycle is completed, disconnect the device from the power source, allow it to cool, and try to remove the jammed product with your fingers. Do not probe with a fork or other sharp object that might damage the heating elements.

Should heating elements need replacement, consult the manufacturer's manual or send the device over to your maintenance department.

CONVEYOR TOASTERS

Plug your conveyor toaster into a receptacle of the correct voltage (shown on nameplate). Consult with your maintenance department to ensure correct voltage and compliance with all safety/fire regulations prior to installation/use.

Your conveyor may be equipped with a push button start control or on-off switch to activate the motor and heating elements. Some models may be energized by the selector dial. On many models a signal light indicates when the device is energized.

Before toasting, set your dial to the indicated "preheat" position. Preheat time, for maximum capacity, is about 20 minutes.

NOTE: Most conveyors are equipped to toast either bread or buns. Be sure to activate the control provided for operation required. The bun control energizes only one half of the heating for one side toasting.

Consequently, buns must be loaded with the cut face toward the machine away from the operator. If your conveyor is equipped for both toast and bun operation, activate the control indicated on the device.

When changing from toast to bun operations, allow about 10 minutes for the unit to adjust to temperature change.

Set the color control dial for the shade of color required.

Each conveyor rack section will hold two, three, or four bread slices or buns, side by side, according to model size.

Some models are designed to permit either front or rear discharge of toasted product. A toast slide is furnished and this can be sloped either way as needed. When the slide is set for rear discharge, the warming drawer and crumb tray must be

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inserted from the rear of the unit. This positioning, during rush hours, enables you to load from the front while the finished toast is unloaded to the rear.

To stop the unit at any time, push the off button or snap off the toggle switch.

CLEANING CARE: POP-UP TOASTERS

The chromium plated finish is easily cleaned by wiping with a clean soft cloth. If your toaster has a satin finish, use a detergent-soaked damp cloth, followed with a clear rinse damp cloth.

- * Use a mild detergent. Avoid spilling any of the cleaning agent into the openings of the toaster. No steel wool or cleanser should be used since it will mar the finish.
- * A removable crumb tray is located at the bottom of the toaster. This should be cleaned daily. Be sure to replace the crumb tray before continuing toasting operations.
- * Some models are equipped with removable base covers. Loose crumbs can be shaken out, but this cover should be taken out and washed to handle persistent accumulations. To remove, disconnect the power and take off the rubber feet and the four screws that secure the base cover. Do not reconnect the power until the base is replaced.
- * The moving parts of your pop-up toaster are designed to operate with a minimum of lubrication. However, the carriage mechanism should be oiled occasionally to prevent excessive wear.
- * Failure of one of the heating elements will result in uneven heating by the others. To avoid interruption of service it is wise to keep spare elements of the proper make and voltage on hand for speedy replacement (consult your maintenance department).

IMPORTANT: When a heating element fails, it must be replaced with the identically rated element. Rating is stamped on the element.

CLEANING CARE: POP-UP TOASTERS

The stainless steel exterior of your conveyor toaster needs only daily wiping with a damp cloth to maintain its original luster. Allow the unit to cool before wiping heated parts.

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- * To remove the conveyor racks for cleaning, hold the carrier chain against the side of the unit, then slide the rack in the opposite direction until it is disengaged from the chain pin, and pull clear.

To replace the racks, make sure that they face directly opposing chain pins or the conveyor will bind. It's a good tip to always leave one rack in its original position to assure proper alignment of replaced racks.

- * When handling racks avoid use of excessive force. A bent rack will cause trouble along the conveyor system.
- * Take care to keep water or cleaning compounds from contact with the conveyor chains. Rust on the chains will threaten the life of the bearings and gears.
- * Do not oil or grease the chains. Burn-off from the heated toaster will convey carbon particles to the bearings. Instead, regularly apply a colloidal graphite lubricant (obtainable from your dealer).
- * The toast warming drawer and crumb tray on your conveyor are removable for cleaning. Replace the crumb tray first.

In the event of failure of the heating elements, call your maintenance or public works department.

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR **ELECTRIC COFFEE BREWERS**

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ENERGY CONSERVATION IN MESSHALLS

PREMIUM BRAND, RIGHT GRIND

Americans drink more than 150 billion cups of coffee a year and they are highly critical of quality.

Place the deliveries in line with consumption to avoid overlong storage. The coffee bean is perishable. It holds enzymes, vital oils and fragrances which are released at the instant of grinding.

Rancidity results when ground coffee is exposed to air. Store opened cans in the refrigerator but away from other foods as coffee picks up outside odors.

Use the grind designed for your equipment. Too fine a grind produces bitter coffee and too much sediment. Too coarse a grind results in a weak, unflavorful beverage.

Brewed coffee retains its delicate flavor for more than 45 minutes. Never reheat brewed coffee or repour brewed coffee back through spent grounds.

HOW TO BREW IN HALF-GALLON AUTOMATIC COFFEE BREWERS

1. Never guess. Accurate measurement is the most important step in brewing good coffee.
2. Place filter in brewing chamber. If cloth filter is used, rinse in hot water.
3. Spread fresh coffee evenly in brewing chamber. An even coffee bed is important to even extraction. Attach brewing chamber to head of machine.
4. Place empty decanter under head and handle toward you. Be sure wire probe (where provided) is inserted in decanter mouth. Push starting button.
5. Check the water temperature. The coffee coming from the brewing chamber must be at least 190°F to ensure that water was 200°F when it was filtered through the grounds.
6. Check the brewing time. All half-gallon brewers should deliver a decanter of coffee in 3 minutes and 20 seconds to 4 minutes and 20 seconds. They will shut off automatically after each brewing cycle.
7. Remove grounds as soon as water has dripped through.

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8. Rinse cloth filter and immerse in clean, cold water until next use. Discard paper filters after each use.
9. Hold coffee at 185-190°F. Never allow it to boil. Never reheat brewed coffee.
10. Serve fresh coffee. Brewed coffee should be discarded after 45 minutes.

BREWING RULES FOR "POUR-OVER" PORTABLES

"Pour-over" plug-in portables let you pour fresh water into a reservoir at the top of the device to obtain the same amount of hot coffee.

In some models, gravity displacement of preheated hot water by cold water is the working principle. In others, water is brought to the boil before brewing a batch of coffee.

Here is the operating sequence for a typical gravity displacement model.

Preheating phase:

- * Slide brewing chamber under spray head and place empty decanter under it.
- * Open top cover and pour two full decanters of cold water into reservoir. Replace cover.
- * Plug into electric outlet of the correct voltage (specified on nameplate of device). Important: Be sure two decanters of water are poured in before connecting the plug.
- * Preheat time will be about 18 minutes, and a signal light will turn on when the water reaches brew temperature.
- * At this point, add a third decanter of water to the reservoir. Hot water will immediately start to flow into the empty decanter beneath the brewing chamber.
- * When the water stops flowing, empty the decanter and replace it beneath the brewing chamber. You are now ready to brew.

Brewing phase:

- * Remove brewing chamber, and place one paper filter in it. Add required amount of coffee of recommended grind. Check that the coffee is evenly leveled before replacing brewing chamber.

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- * Add a decanter full of cold water to the reservoir. Coffee will immediately start to brew and flow into the decanter under the brewing chamber.
- * When the flow stops you are ready to serve.
- * Discard the paper filter and used grounds before starting another brewing cycle.

NOTE: Because of the differences of design between makes, you are urged to comply with the published instructions of the individual manufacturer.

BREW EXCELLENCE INTO YOUR COFFEE SERVICE

Electric half-gallon batch brewers are the modern solution wherever a fast supply of fresh coffee is demanded for continuous or intermittent service.

A wide range of models is in use to provide uniform quality service through automatic controls that accurately measure the time and temperature of the brewing cycle. Many models are available with modular add-on warmer units to provide complete flexibility of system design.

Most brewers dispense half a gallon of coffee at one time directly into a glass or stainless steel decanter. The most popular "fixed station" type requires both water and electrical connections. A second "pour-over" type is a portable plug-in unit that requires no plumbing.

Also in use are larger units utilizing the same principle as half-gallon brewers, but equipped with holding tanks of up to 3 gallons capacity.

All of these models will improve your coffee service. Clean equipment is essential to fine coffee brewing. So is a quality brand coffee of the correct grind for the equipment.

NOTE: Some brewers use a drip grind, others a fine grind.

Water is important, too. Hard water should be conditioned, not chemically softened, which imperils flavor. In hard water areas, a recommended water conditioner should be connected to the inlet line. Where chlorination is heavy, an activated carbon fine filtration system should be considered.

ENERGY CONSERVATION IN MESSHALLS

The following instructions are offered as a general guide to correct use and care of half-gallon coffee brewers. However, to secure the best results from your equipment you are strongly urged to comply with the operating instructions issued by the manufacturer.

SIMPLE EQUIPMENT CARE FOR BREWING EXCELLENCE

Simple care of your equipment makes an important contribution to the excellence of your coffee service.

All parts of the brewer that come into contact with the coffee and coffee vapor should be kept immaculately clean.

Decanters, for example, should be thoroughly cleansed and rinsed free of detergent after each use.

Spray heads should be checked regularly for traces of lime or other deposits in or around the holes. Keep them clean.

Paper filters should never be reused. Discard after each brew. Paper filters, incidentally, can pick up odors from other foods. Be careful where you store them.

Cloth filters should be rinsed in hot water after each brew and stored overnight in a vessel of fresh, cold water. Replace cloth filters often to ensure good tasting coffee. A simple sniff test should tell you when it is time to change.

New cloth filters should be cleaned and rinsed in very hot water to remove sizing (starch) and cloth odors. Do not use soap, bleaches, or detergents; they transfer flavors.

If you brew in sealed filter bags and stainless steel filter screen, rinse out the holding cartridge and the screen daily. Once a week, soak the screen overnight in a solution of urn cleaner, and rinse thoroughly before reusing.

Clean the fluid seal diaphragm (around the spray head) daily.

It is good practice to place a partially filled decanter under the brewing chamber when the device is not in use. Also, after each brew, it is best not to remove the brewing chamber until the dripping has completely stopped.

To clean the exterior of the device and the warming units use water and damp cloth only. Avoid use of caustic cleaning compounds or detergents.

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(Acknowledgement is given to the Coffee Brewing Center, 120 Wall Street, New York, NY 10005, for many of the use-and-care recommendations appearing in this section).

HOW TO GET MAXIMUM PERFORMANCE FROM YOUR

ELECTRIC COFFEE URNS

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ENERGY CONSERVATION IN MESSHALLS

YOUR ELECTRIC COFFEE URN

Good coffee is composed of three elements: a quality brand of the right urn grind, fresh water, and modern electric brewing equipment.

The way you use these materials produces the end result: patron pleasure or displeasure.

Hard water should be conditioned, not chemically softened. In many hard water areas, a recommended water conditioner should be connected to the line supplying water to your coffee brewing equipment. Where chlorination is heavy, an activated carbon fine filtration system should be considered to assure clear fresh water and keep coffee free of displeasing tastes and odors.

The final element is your electric urn, which may be one of three basic types:

Manual. Requires the most skill. Water is brought to boil in the outer jacket. It is then drawn off and poured over the coffee grounds, which are in the leacher on top of the liner.

Semi-automatic. Siphons water over the coffee grounds through a spray nozzle, automatically controlling the amount of water to be siphoned or required to refill the urn jacket.

Fully automatic. Controls the complete coffee brewing cycle automatically at push-button command, eliminating human error.

Because of the wide variety of makes, models, and sizes of electric coffee urns, this manual is offered only as a general guide.

To obtain maximum performance from your coffee urn, comply carefully with the operating instructions issued by the manufacturer.

COFFEE BREAK

The earliest known coffee drinkers were 11th century Arabians. The habit spread, but it was not until 1723 that smuggled seedlings were first planted in the West Indies, then South America.

The coffee bean is perishable. It holds enzymes, vital oils, and fragrances which are released at the instant of grinding. These are best preserved in vacuum cans.

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Rancidity results when ground coffee is exposed to air. Store opened cans in the refrigerator but away from other foods as coffee quickly picks up outside odors.

Brewed coffee retains its delicate flavor for no longer than 45 minutes, and should be discarded if not served within the hour. Never reheat brewed coffee or repour brewed coffee back through spent grounds.

HOW TO GET THE MOST OUT OF YOUR URN

Your modern electric coffee urn controls both cost and quality. Correctly operated and cared for, you can depend on your electric urn to turn out fine coffee time after time.

Control is the key to quality. Your urn is equipped with precision electric controls and responsive electric heating elements that regulate brewing time, and brewing and holding temperatures.

If your coffee urn is new, make sure that all installation procedures recommended by the manufacturer have been complied with.

Operate your coffee urn at correct voltage (specified on nameplate) to avoid malfunction.

Coffee urns, particularly manual types, should be operated only by experienced personnel who have been trained in correct use and care practices.

The following brewing steps are recommended by the Coffee Brewing Center:

- * Accurate measurement is the first critical step in brewing good coffee.
- * Spread fresh urn grind coffee evenly in the filter (bag, basket, or paper). An even coffee bed is important to extraction. If a new urn bag is used, rise it in hot water before placing it on the urn bag ring. If urn is not equipped with a brewing basket, use a gridded riser to support the bag.

Use fresh boiling water. The urn should be attached to a cold water line. The water temperature should be 200°F when it comes in contact with the coffee.

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- * Pour water in slow circular motion, making sure you wet all grounds evenly. Total contact time must be completed within 4 to 6 minutes when using urn grind. Replace urn cover between pours to preserve aroma. (Automatic models perform these steps for you from the moment you touch the button.)
- * Remove grounds and filter device as soon as the water has dripped through. Neglect to do this results in bitter flavor transfers.
- * If cloth filter is used, rinse it in clear hot water, then store in cold water until next use.
- * Mix the brew. Draw off the heavy coffee from the bottom of the urn and pour it back into the brew to promote uniform mixing. Mix at least 1 gallon for each pound of coffee used.
- * Never repour brewed coffee back through spent grounds. It only results in a bitter taste.
- * Hold coffee for service at 185°F to 190°F. Don't let it boil.
- * Never reheat brewed coffee. Brewed coffee should be discarded after 1 hour.

URN CLEANING CARE IS CRUCIAL

To maintain top quality coffee service urn cleaning care is crucial.

Surfaces exposed to brewed coffee or coffee vapor accumulate deposits. Also lime deposits from water minerals will collect. Consequently, a rigorous cleaning program must be followed to prevent unpleasant tastes and odors.

Daily Program

Clean the urn immediately after each use. First rinse with a small amount of water to remove sediment and old coffee from the bottom of the urn and drainage line. Put a gallon or more of hot water in the urn and nylon brush the inside carefully, then drain and rinse with hot water until it runs clear. You are now ready to brew up the next batch.

At the end of each day, clean and brush the urn several times, then rinse thoroughly with hot water.

ENERGY CONSERVATION IN MESSHALLS

Remove the clean-out cap at the end of the faucets (or take apart faucets that have no caps) and scrub the pipe leading to the center of the urn. Clean the gauge glass with brush. Rinse.

Scrub the faucet, then rinse it thoroughly with hot water.

Overnight, leave a gallon or more of fresh water in the urn until next morning's use.

Remove the cover and clean. When replacing the cover leave it partly open overnight.

Remember next morning to empty and then rinse the urn with boiling water before starting to brew.

Semi-weekly Program

Fill the outer jacket 3/4 full of water. Turn on the heat and fill the urn liner 3/4 full of water. Use an urn cleaning compound recommended by the manufacturer. Mix the cleaning compound thoroughly with the water in the liner and let it stand for 30 minutes.

Clean the gauge glasses, faucet pipes, plugs, and any other deposit-collecting surfaces. Scrub with cleaning compound. Dismantle faucets for thorough cleaning.

Scrub urn interior and cover. Do not overlook the lug nut in the base of the urn liner.

Rinse inside of urn three or four times with hot water. Repeat until all traces of odors and cleaning compound are removed.

Check spray head. If any holes are clogged, use copper wire to open and remove deposits.

Leave a gallon or more of fresh water in the urn overnight (with cover partially open) as with daily program.

Gridded risers and urn baskets may be cleaned by immersing in urn cleaning compound and scrubbing with a stiff brush. Rinse and dry thoroughly.

Never use soap, scouring powders or abrasives to clean coffee brewing equipment.

ENERGY CONSERVATION IN MESSHALLS

New urn bags or cloth filters should be cleaned and rinsed in very hot water to remove sizing (starch) and cloth odors. Neglect will result in a cloudy beverage and unpleasant taste.

Rinse urn bags and cloth filters after each use. Use hot water. Avoid soap bleaches or detergents. They transfer flavors.

Store in cold water when not in use to prevent sourness or rancidity.

Urn bags and cloth filters have no specific wear-out period. Replace them when they show signs of wear or develop an unpleasant odor.

(Acknowledgement is given to the Coffee Brewing Center, 120 Wall Street, New York, NY 10005, for many of the use and care recommendations appearing in this section.